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Section of Medicine.¹

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President's Address.

DR. KONRAD HILLER (Melbourne), in his presidential address, surveyed the present position of syphilis. He prefaced his remarks with a summary of the views put forward in previous congresses—those of 1908, 1911 and 1914—especially by the late Sir Harry Allen, at that time Professor of Pathology at the University of Melbourne, and contrasted them with the views now generally held as to the luetic origin of certain affections then asserted to be of that nature.

The view then held, that aneurysm of the aorta was almost entirely syphilitic in origin, had been fully sustained; so regularly was this affection of that nature that a failure of response to the Wassermann test in any given case rendered serious reconsideration of its diagnosis advisable. On the other hand, aortic regurgitation, regarded then as mostly of syphilitic origin, was much less frequently due to this cause, though it was admitted that many cases were ascribed to syphilis, but other affections might produce a similar condition of the aortic valve. When syphilis was the factor, it was almost invariably part of an associated aortitis.

In contradistinction to the assertion that coronary occlusion was usually due to syphilis, it was now firmly established that it was rarely so; and when it was, it was almost invariably due to an extension of syphilitic

¹ The meetings held by the Section of Medicine with the Section of Surgery and the Section of Radiology and Electrical Therapy and with the Section of Public Health, Preventive Medicine and Tropical Hygiene and the Section of Obstetrics and Gynaecology have been recorded.

aortitis to the origins of the coronary arteries. Atherosclerosis was the great cause of coronary occlusion.

The view that mitral obstruction owed its formation largely to syphilis received very little support, though it was likely that marked cases of this affection occurred in congenital syphilitics, but even then rheumatic fever or some manifestation of it was the prime factor. It was held also that chronic interstitial pneumonia, when not due to dust or tuberculosis, was usually caused by syphilis. This was probably true, but the same could not be said of fibrosis of other organs, such as the pancreas.

Whilst at that time it was tentatively suggested that general paralysis of the insane and *tubes dorsalis* were syphilitic affections, it was now beyond doubt that the former always had that disease as its cause, and such a diagnosis was now not permissible in the absence of a positive response of the serum or cerebro-spinal fluid to the Wassermann test. As regards *tubes dorsalis*, though generally regarded as of luetic origin, it gave a positive reaction much less frequently.

The second part of Dr. Hiller's address was devoted to an examination of the frequency of fresh infections of syphilis in Melbourne over the last twenty years, and to an endeavour to ascertain from statistics—especially those of the Royal Melbourne Hospital—the effect of modern treatment on the incidence of the late manifestations of syphilis. As regards the former, the records of the male venereal diseases clinic of the Health Department were utilized. It was estimated that this clinic dealt with two-thirds of the fresh infections in males in Melbourne, and it had been under one control from its inception in 1918. These figures showed a steady diminution in primary and secondary syphilis. It was probable that this was being brought about not only by a more widespread knowledge of the disease so that the affected individual sought advice and treatment early, but also by the effect of the newer forms of treatment, which, if vigorously pursued, rapidly rendered the individual non-infective to others. This was the hopeful aspect of the ultimate control of the disease.

In the further investigation of the effects of modern treatment on the incidence of the late manifestations of the disease, syphilitic affections of the aorta and general paralysis of the insane were taken as types. It was shown that as far as the former was concerned, there had been little diminution in numbers in the Royal Melbourne Hospital in the previous ten years, and that the statistics of the mental diseases hospitals gave a similar result in dealing with the incidence of general paralysis of the insane. The number of deaths from these diseases, as obtained from the Victorian Government Statist, corresponded with this finding, which suggested that treatment in the early stage of the disease had been inadequate. On the other hand, the report from the Melbourne Children's Hospital of the prevalence of congenital syphilis showed a steady falling off in numbers. This might to some extent be due to the discovery in ante-natal clinics of syphilis in the mother, efficient treatment in whom would be likely to result in the birth of a healthy child. The number of deaths from congenital syphilis showed a similar diminution.

Dr. Hiller arrived at the following conclusions:

1. That fresh infections of syphilis were steadily diminishing in Victoria and that congenital syphilis was also becoming less frequent.
2. That as far as his survey went, evidence existed that treatment in the early stages of the disease had been inadequate.

The Modern Treatment of Syphilis and its Relation to Hepatic Function in Health and Disease.

Following on Dr. Konrad Hiller's presidential address, which he entitled "A Survey of Syphilis", the Section of Medicine discussed "The Modern Treatment of Syphilis and its Relation to Hepatic Function in Health and Disease".

DR. IVAN MAXWELL (Melbourne) read a paper entitled "Physiological and Biochemical Considerations of Hepatic

Function in Health and Disease". He began by stating that his communication was primarily concerned with the activities of the liver in health. Only brief reference to disturbance of its functions due to disease would be made, as this aspect of the subject was essentially within the domain of the pathologist.

The liver was undoubtedly the most important centre for chemical transformations in the human body. It had a great variety of functions, the chief of which might be summarized as: storage of glycogen, desaturation of fats, deamination of amino-acids, secretion of bile salts, excretion of bile pigments, formation and destruction of red corpuscles, detoxication of products of putrefaction of proteins, formation of fibrinogen and regulation of coagulation of blood, storage of the haematinic principle, storage of vitamins, adjustment of the reaction of the blood.

Dr. Maxwell said that he intended to refer only to those functions which were of special clinical interest.

In discussing storage of glycogen, he said that the normal liver stored glycogen in varying amounts, depending upon the nature of the diet previously administered to the animal. Frequently 200 grammes or more might be found deposited within its cells. A diet rich in carbohydrates increased this glycogen storage and, on the contrary, starvation rapidly caused depletion of liver glycogen. This depletion was accelerated by exercise, cold, or the administration of strychnine, which caused increased metabolism. During the normal life of man there was constantly occurring either: (i) synthesis of glycogen from glucose derived from the food ingested or from body protein, and also from lactic acid liberated during muscular contraction; or, on the other hand, (ii) hydrolysis of glycogen (glycogenolysis), which was due to nerve impulses conveyed by glycogenolytic fibres to the liver or by the action of various hormones secreted by the endocrine glands. Dr. Maxwell illustrated these effects by the accompanying diagram.

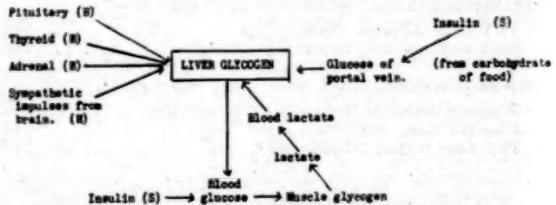


Diagram illustrating factors influencing synthesis and hydrolysis of liver glycogen. (H) indicates hydrolytic action. (S) indicates synthetic action.

He went on to say that the work of McNealy and Willems, Corkill and others indicated that absorption of glucose did not occur from the large intestine in man. These findings were of the greatest clinical importance, for it was obvious that if glucose was to be rapidly administered to a person suffering from hypoglycaemic coma due to an overdose of insulin or from ketosis associated with *diabetes mellitus*, or if an attempt was being made to store glycogen in the liver for any reason, then rectal administration was futile. The addition of glucose to saline solution administered rectally for the post-operative treatment of shock might actually tend to hinder the absorption of the saline solution, owing to the non-absorbed glucose drawing fluid osmotically from the blood vessels in the bowel wall. If the oral method was impracticable owing to excessive vomiting, then the intravenous route ought to be adopted. A 5% solution of glucose in water was isotonic with blood and was used for intravenous medication. If much sodium chloride had been lost from the body through vomiting or haemorrhage, glucose in isotonic saline might be administered intravenously. Hepatic syphilis had remarkably little effect in causing disturbance of liver function which could be detected by clinical or biochemical investigation. Jaundice very rarely occurred in the course of this disease, but it might result from the use of organic arsenical drugs in the intensive treatment of syphilis.

Such jaundice was usually associated with a Van den Bergh reaction of the biphasic type. A person whose liver had an adequate storage of glycogen was less prone to hepatic disturbance following the use of arsenical preparations than one whose liver was depleted of this carbohydrate.

Dr. Maxwell then discussed desaturation of fats. He said that the normal liver contained approximately 1% or 2% of fat and about 3% of lecithin. In poisoning by phosphorus or chloroform and in *diabetes mellitus*, pernicious anaemia and other pathological conditions the fat content of the liver might be enormously increased. If an animal was starved to remove adipose tissue and then fed a specific fat which could be readily recognized by characteristic chemical tests, and if the animal was finally poisoned with, say, phosphorus, then it was found that the fat present in abundance in the liver had come from the fat depots. In other words, it was not produced locally in the liver, but had been transported from elsewhere and stored in the hepatic cells. Normally the fatty acids present in the liver fat had a higher iodine value than those in depot fat. Leathes had suggested that depot fat was transferred to the liver and there underwent desaturation and was united with phosphorus and nitrogen and then conveyed to the tissues for oxidation. The question of desaturation of fats in the liver had been much debated in recent years. There was still evidence that it did occur at this site and probably also in other tissues of the body.

Recent work by Best and his colleagues at Toronto had indicated that the quantity of fat stored in the normal liver largely depended on the choline content of the diet. In the absence of choline large amounts of fat accumulated in the liver. Furthermore, livers in which excessive amounts of fat had accumulated could be brought back to normal fat content by the administration of choline.

Dr. Maxwell said that if this work on animals was confirmed in human beings the administration of choline should enable clinicians to control the fat content of the human liver, and the discovery ought clearly to be regarded as of the greatest clinical importance. How choline acted in this respect was still a matter of conjecture.

Discussing the storage of the haematinic principle, Dr. Maxwell said that Whipple had demonstrated that the administration of liver to dogs which had been subjected to severe haemorrhage was very effective in causing the formation of new blood. This observation had led Minot and Murphy to discover that feeding with raw or slightly cooked liver had an amazing effect in restoring the blood to normal in pernicious anaemia. The precise chemical constituent of the active haematinic principle in liver had not been determined, but it was thought to be in the nature of a polypeptide containing a complex resembling glucosamine. Wilkinson had prepared liver extracts of such potency that as little as 17 milligrammes would cause a marked reticulocytosis in pernicious anaemia. Evidence had been produced by Castle and his colleagues that this haematinic principle was produced in the stomach by the action of an intrinsic factor with properties of an enzyme on an extrinsic factor contained in various foods, particularly beef.

In conclusion, Dr. Maxwell particularly emphasized certain features:

1. The futility of any attempt to increase the glycogen content of the liver by rectal administration of glucose in man.
2. The importance of bile salts as cholagogues and in aiding the solution of cholesterol in bile.
3. The intensive storage of the haematinic principle in the liver.
4. The important rôle that choline might play in the future therapeutic control of the fat content of the liver.

PROFESSOR J. B. CLELAND (Adelaide) read a paper dealing with the pathological aspects of the subject. He said that in his record of 4,000 autopsies there were only four cases apparently directly associated with the treatment of syphilis by "Novarsenobillon" or other similar drugs. In

two of these the autopsies indicated damage of some sort to the liver. One of the subjects was a woman of forty-two years of age who had received twenty-five injections of "Novarsenobillon", the last some three months before the onset of jaundice, which gradually increased in intensity. At the autopsy a small liver was found with much destruction of the liver cells. As *post mortem* changes had been taking place in some of the organs, it was hard to determine how much of this toxic change was *ante mortem*. It was probable, however, from the size of the liver, that this was an example of *icterus gravis* occurring some months after the cessation of active treatment.

The other case was that of a man, aged thirty-three years, who had received "a dozen or so" injections of "Novarsenobillon" and a similar number of bismuth injections. He contracted jaundice. His gall-bladder was removed; secondary haemorrhage occurred and he died under the anaesthetic. At the autopsy the liver was markedly bile-stained and rather tough and weighed 52 ounces. No report was available of the microscopic appearances.

Professor Cleland then reviewed Sézary's paper in *La Presse Médicale*, October 25, 1933, on jaundice occurring in persons treated by the arsenobenzenes. This author had found that jaundice was nearly always mild in France, though severe cases might occur elsewhere. The jaundice might appear at any period after infection, even in general paralytics. He considered that the jaundice might be caused by several different conditions.

Professor Cleland epitomized Sézary's four theories as to the pathogenesis as follows:

1. The purely toxic theory seemed excluded by the jaundice disappearing in some instances when the drug was discontinued; in others when its administration was persisted in, which latter would be expected to increase the damage. The suggestion that certain "brews" of the drug were responsible was countered by only an occasional person contracting jaundice from the same batch of the drug.

2. The second theory was that of the reactivation of latent treponemata. The occurrence of jaundice in patients treated by these drugs when not suffering from syphilis, for instance, in cases of psoriasis and malaria, dismissed this theory.

3. The third theory was that the jaundice was due to the activation of the virus of catarrhal jaundice. Sézary considered that this explained most of the French cases which tended to occur in places, seasons and years when there were an unusual number of cases of catarrhal jaundice in the community.

4. The allergic theory was the fourth theory. If this was the explanation, Sézary considered that cases should occur about ten days after injection, whereas they might occur weeks after cessation of treatment. Again, continuance of the drug might result in cure, possibly by desensitization, but in other cases it might aggravate the lesions.

Professor Cleland said that his own views were purely theoretical and the suggestions he had to make would be difficult to prove or disprove. He felt that the most likely explanation was some allergic response, probably of the same nature as the sensitization which might occur to formalin and other non-protein substances. This might be due to some protein-arsenic combination acting as an allergic agent. He also suggested that some protective substance might be inhibited or an activator liberated, or that some change occurred in the permeability of the cell membrane, or that some solvent of the arsenic molecules might be produced, thus enabling the drug to damage cells which otherwise were protected.

DR. E. H. MOLESWORTH (Sydney) discussed the subject from the therapeutic point of view. He said that since 1912 the provision of modern treatment with arsenical and bismuth drugs in addition to the original mercury and the opening of evening clinics had enabled prolonged and systematic treatment of all cases of syphilis to be undertaken without the patient running any danger of losing his job. This had brought about a very remarkable

change in the incidence of syphilis. Whereas in the earlier years thousands of patients had been treated for this disease in the various evening clinics, today the latter were used almost exclusively for the treatment of patients who suffered from late visceral or neural syphilis, or of those who had a persistently positive serum reaction.

Nowadays it was extraordinarily difficult to find a patient with recent syphilis for demonstration to students. During the past five months only two patients with primary or secondary syphilis had applied for treatment at the Royal Prince Alfred Hospital. The extraordinary and satisfactory diminution in the incidence of syphilis at the present time could, on analysis, be ascribed only to the great shortening of the period of infectivity of the individual patients. This was brought about obviously by the use of intensive methods of medication with the arsenical drugs.

Without going into details, Dr. Molesworth stated that each patient on application for treatment was given one of the arsenical drugs in as big a dose as he could be reasonably expected to tolerate without damage. These doses were given at first every week, but, after two or three injections, intervals of a fortnight or longer were allowed between the arsenical injections. These gaps were filled by weekly injections of a bismuth preparation. The first dose of the arsenical drug in an adult otherwise healthy was not less than 0·45 grammes of "Neosalvarsan", but if the patient was ten stone or more in weight, 0·6 grammes was given. In selected cases under the direct control of the honorary medical officer in charge later injections were often of the strength of 0·9 grammes. In Dr. Molesworth's private practice this dose was given very frequently. It was necessary, of course, to watch for signs of intoxication, as, for instance, albuminuria, dermatitis, jaundice *et cetera*. Provided sufficient space between doses was allowed, such events were in his experience extraordinarily rare. For example, since 1918 he had had only one case of arsenical exfoliative dermatitis in the hospital clinic. They had admitted to hospital quite a number of patients suffering from exfoliative dermatitis due to arsenical medication, but, with the above exception, these had all been patients treated outside the hospital, and almost all by injections, which, in the opinion of those working at the clinic, had been insufficiently spaced. Under their system the patient, even though brought under treatment before the serum reaction became positive, was given not less than twenty injections of "Neoarsphenamine" with bismuth as well. In patients whose syphilis was well established, the total amount of arsenical drug administered was generally very much greater, depending, of course, upon the period at which the serum action was reversed.

It would be seen, therefore, that with the thousands of patients, and very many more thousands of injections of arsenical drugs, if interference with hepatic function was a real danger, there should have occurred a notable number of cases of acute yellow atrophy and jaundice during the period that had elapsed since the syphilis clinic was organized. So far from that being the case, however, they had not had one single case of acute or subacute yellow atrophy occurring in a patient treated with the arsenical drugs for syphilis. The in-patient records had been searched for the period 1910 to 1936 at the Royal Prince Alfred Hospital. Seven cases of acute yellow atrophy and four of subacute yellow atrophy were unearthed. None of these patients had syphilis, and none had had any arsenical medication. On the other hand, there had been seven cases of toxic jaundice ascribed to arsenical medication, one case of toxic jaundice with nephritis and dermatitis, and one case of dermatitis. There was evidence to show that in at least three of the cases of jaundice such a long interval had elapsed that the influence of arsenic in the production of the jaundice was extremely doubtful.

Even before the days of arsenical medication jaundice had been known to occur in syphilitic patients. If a drug was to be regarded as playing a part in the determination of jaundice, there seemed to be almost as much ground

for suspecting mercury and bismuth as the arsenical preparations. The experience of the Lees, father and son, who had been in charge of the venereal disease clinics at the Edinburgh Royal Infirmary and Edinburgh Corporation for many years, did not differ materially from the results which Dr. Molesworth had recorded from the Royal Prince Alfred Hospital. The danger of serious damage to liver tissue and liver function as the result of the modern treatment of syphilis would, therefore, appear to be negligible. In any case, even if such damage occurred very much more frequently than it did, the enormous benefit provided to the great majority of individual patients and to the community as the result of the use of the modern arsenical and bismuth drugs in the treatment of syphilis would make it still necessary to continue with these methods in the interests both of the patients and of the community.

Dr. E. COOPER (Melbourne) agreed with Dr. Molesworth that it was quite possible that other drugs besides arsenic were potential causes of toxic sequelae. He described a patient who was treated with a total of 3·15 grammes of colloidal bismuth following on a course of mercury and iodides. Exfoliative dermatitis appeared three months later, from which the patient eventually recovered. Three weeks later still, however, a fatal nephritis supervened. *Post mortem* both macroscopic and microscopic damage was very extensive. Approximately only one-third of the liver had a normal appearance and widespread damage and necrosis were visible. On sections of the gluteal muscles a large amount of bismuth was still present in an oily emulsion. Dr. Cooper further described two cases in which bismuth was detectable by X-ray examination in the buttocks long after injection. In one of these instances calcification was also present. He agreed with Dr. Molesworth that the danger of bismuth had not been properly assessed. He had found one case in the literature of bismuth poisoning in a child. While endorsing the view that the treatment in the first and second stages was by far the most valuable, Dr. Cooper said that he doubted whether any distinction existed between primary and secondary stages. He had recently read of a patient who developed syphilitic osteitis some weeks after receiving a blood transfusion. No signs of a primary or secondary stage had appeared in the meanwhile. Dr. Cooper finally referred to the apparent protective effect of pregnancy in suppressing clinical manifestations of syphilis at this time, and also to the rarity of liver damage following arsenic injections in pregnant women.

Dr. Molesworth replied to Dr. Cooper. Before doing so, he referred to the recommendation made by the President that the cerebro-spinal fluid should be examined at the end of three years' treatment. He agreed that this was a most desirable measure, but he anticipated difficulty in persuading private patients to submit themselves to lumbar puncture. Dr. Molesworth deplored the fact that general practitioners sometimes delayed the giving of arsenic until some weeks after early syphilitic infection had appeared. In this way the important period for successful treatment was irrevocably wasted. Dr. Molesworth said that he did not wish to over-emphasize the danger of bismuth intoxication because of the proportionately few instances which occurred as compared with the very large number of bismuth injections given. The toxic manifestations, he stated, were much rarer than those which followed the use of mercury.

He agreed with Dr. Cooper that no real histological distinction could be made between the various stages of syphilis. What was of more practical importance, however, was to distinguish the early period when the reversibility of the response to the Wassermann test was much easier than at later stages. The reason for this was obscure, but Dr. Molesworth thought that it might be due to the fact that the patient's resistance was, perhaps, then at its highest. With regard to the influence of pregnancy, he referred to the remarkable and equally curious fact that a woman rarely showed any signs of the disease during her child-bearing period, but that at the menopause many visceral lesions presented themselves.

Prognosis in Coronary Occlusion.

Dr. M. D. SILBERBERG (Melbourne) read a paper on the prognosis in coronary occlusion. He analysed 335 cases of coronary occlusion. The ratio of male to female patients was 3·8 : 1. The ages were recorded in 318 cases; the majority (65·4%) occurred between the fifth and seventh decades. The youngest patient was a male aged twenty-three years; the oldest, a male aged eighty-six years. One hundred and thirty-three patients were known to be dead, and one hundred and forty-nine were still living. Fifty-three were untraced.

Death occurred within twenty-four hours in thirteen cases, or 9·8%. Three patients survived until the ninth year; five were still living after a period of between eight and ten years since the initial attack. Dr. Silberberg pointed out that averaged statistics were of little value when applied to individual cases. Electrocardiograms were more useful in diagnosis than in prognosis, except when a series of curves was obtained over a period of several months.

Coronary thrombosis was not usually found at autopsy; hence the term "coronary occlusion" was to be preferred in clinical diagnosis. An attempt should always be made to visualize (a) whether actual infarction had occurred, judged partly by the severity of the attack and partly by a rise in temperature for several days; (b) whether a small or a large branch of a coronary artery was involved, as estimated mainly by the rapidity of recovery from the initial symptoms of pain and collapse.

The prognosis was usually worse in the presence of signs of cardiac enlargement and arteriosclerosis, but fatal cases were not uncommon in which physical signs were slight or absent. Coronary atheroma might exist without apparent clinical signs or symptoms. The presence of signs indicating central and peripheral circulatory failure was of grave prognostic significance. Single symptoms, such as pain, or single signs, such as low blood pressure or the presence of pericardial friction, were not reliable guides to prognosis. Prognosis was seriously affected by the presence of other general or systemic diseases, such as bronchitis or renal degeneration.

Dr. Silberberg laid stress on the importance of recognizing the "crescendo" type of coronary occlusion, in other words the cases in which the advancing coronary occlusion resulted in the production of anginal symptoms from progressively less and less effort. He also stated that excellent recovery might occur in cases of coronary occlusion, even in those of great severity.

Dr. H. HUME TURNBULL (Melbourne) said that in a discussion of this kind the first great difficulty was one of definition. There seemed to be little doubt that in many cases of fatal occlusion of coronary arteries no actual thrombosis was found, and when patients with the classical syndrome died in hospital no thrombosis but obvious atheroma with occlusion had been found. This was important, as any figures representing percentage recoveries in this condition depended on what the physician regarded as a picture sufficient to make the diagnosis. If only the full classical syndrome of pain and shock was to be accepted, the problem was different from that presented if all cases of sudden onset with the features of coronary occlusion were included. In Dr. Turnbull's opinion these should be included, though they made the picture more nebulous, and made it perhaps impossible to present satisfactory statistical tables. Dr. Turnbull said that he would include all cases in which definite cardiac inadequacy arose suddenly and a diagnosis of a coronary vascular cause was upheld. Such patients should be treated by full and prolonged rest in bed and a rigorously careful convalescence, as in the more dramatic case. If this was done, many recovered completely, and the figures shown were better than if a massive attack only was recognized. Again, the criteria of coronary occlusion were not very definite, and at times diagnosis was difficult or even impossible, so that any series of cases would include some which other clinicians would consider doubtful. However, there were two points which could be stressed with some safety: (1) the prognosis was vastly better than most writers of five or six years before would have led them

to believe; (ii) the electrocardiograph was of little or no value in prognosis.

Prognosis in the first three weeks should be very guarded, and no very sound opinion could be given till the patient was going about. If congestive failure followed coronary occlusion, the outlook was very grave and few patients made even a partial recovery. The prognosis was definitely worse when hypertrophy or other obvious evidence of cardiac damage was present.

Dr. Turnbull concluded by saying that the attempted separation between coronary occlusion and coronary sclerosis was very artificial and often very unconvincing. They represented stages of the same state which was atherosoma and not arteriosclerosis; and occlusion might be silent and symptomless, so that no clear distinction could be made without autopsy, and even then cases in which a confident diagnosis of occlusion was made during life sometimes showed no definite infarction.

PROFESSOR D. W. CARMALT-JONES (Dunedin) stated that in estimating prognosis it was advisable never to be gloomy and so to run the risk of making the patient an invalid or to restrict his activities to an unnecessarily severe degree, as the progress made by patients varied tremendously after coronary occlusion. He described three patients illustrating this point. The first patient, aged forty years, collapsed at work, and when seen was already moribund and died after severe pain and dyspnoea. The second patient was a labourer, aged fifty years, who had experienced a trivial pain about the chest, which was succeeded by an attack of very severe precordial pain. This patient had never been able to do the slightest amount of work since, because of recurrent pain on the slightest physical effort. The third patient was a doctor who had suffered a considerable degree of precordial pain succeeded by a desperate attack of cardiac failure, and when seen was collapsed and barely conscious. He was advised to take three months' rest. He remained away from work for six months; since then he had returned to practice, which he had continued uninterruptedly for the past four years. This instance illustrated the amazing amount of recovery which might take place after even a seemingly desperate attack.

Dr. Silberberg, in reply, stated that he had adopted the conservative method of making a selection of cases on which to base his paper. He agreed with Dr. Turnbull that if patients with anginal attacks were carefully examined, more instances of minor coronary occlusion would have to be included. If, after the patient started to get about, serious symptoms, such as pronounced dyspnoea, developed, the prognosis was distinctly bad. Dr. Silberberg ascribed a certain value to serial cardiography, but agreed that it was not of much help in prognosis. He agreed with Professor Carmalt-Jones that it was most important to avoid making a patient anxious or neurotic. He had not quoted many case histories, as these did not give a broad enough view on which to base principles of prognosis.

The Treatment of Pyelitis.

DR. ALEX MURPHY (Brisbane) read a paper on the treatment of pyelitis. He based his remarks on experience in private and public hospital practice, on study of the records of the Brisbane Hospital and on a survey of the literature. He included in the term "pyelitis", suppurative infections of the kidneys, ureters and bladder and divided each of these into acute and chronic forms.

He said that the diet should be mostly fluid, but that fruit and carbohydrate foods should be allowed; he saw no objection to the use of milk. Purgatives were to be avoided, but a little liquid paraffin should be given to prevent the stools from becoming hard and a simple enema given every second or third day would suffice. There was nothing to be gained by employing the bowel as an instrument for dehydration when one of the principal aims was to obtain free elimination by the kidneys of a deliberately increased fluid intake.

Fluid should be pushed to the limits of the patient's capacity and five or six pints a day should be insisted on. Dr. Murphy usually allowed a little salt with drinks

because it made them more palatable. Theoretically, the salt should favour water retention, but in practice it did not appear to interfere with diuresis.

Alkalies were the best drugs to use, but they should be given in sufficient quantities to keep the urine alkaline throughout the twenty-four hours. Sodium or potassium citrate was the drug most employed, but in his experience large doses were apt to cause nausea and even vomiting. Vomiting could scarcely be ascribed to alkalosis, for with free diuresis and good renal function vomiting must be rare. For some years he had used a mixture containing fifteen grains each of potassium citrate, potassium bicarbonate, sodium citrate and sodium bicarbonate flavoured with orange, and he had found that it was well tolerated. With this treatment most patients were relieved of their symptoms and would be afebrile in from three to six days. The urine should be examined microscopically at frequent intervals and treatment should be continued until no pus or organisms had been found for some weeks. Mandelic acid was contraindicated in the acute stages of pyelitis, but once the acute stage had been passed it should always be used, for it would usually sterilize the urinary tract in a few days and thus a great deal of time would be saved.

In the treatment of chronic pyelitis, Dr. Murphy had had no success with the use of alkalies. He had, however, found that hexamine in the form of "Hexsotate" was often efficacious in bacilluria. Hexamine acted in liberating formaldehyde in an acid medium. For this purpose sodium acid phosphate or ammonium chloride was given in doses of twenty to thirty grains three or four times a day. Dr. Murphy had found the use of vaccines disappointing. He had had no success with the use of a ketogenic diet. Mandelic acid had proved a most effective weapon in the treatment of chronic pyelitis. It was excreted unchanged in the urine and, provided that the pH was maintained at 5.3 or less, doses of the sodium salt in the neighbourhood of 180 grains in the twenty-four hours rendered the urine bacteriostatic. Ammonium chloride in doses of twenty to thirty grains four times a day was used to control the pH. In this way the urine of the majority of patients became sterilized in from seven to ten days.

Dr. Murphy also discussed the use of ammonium mandelate and said that, provided the urine was acid, this drug would, in the majority of instances, make the urine sterile within ten days. He also referred to calcium mandelate.

Dr. Murphy went on to say that it was most important that if the urine failed to become sterile on mandelic acid treatment, or if recurrence took place, some complicating factor should be suspected and further investigation undertaken. Distant foci of infection in teeth and tonsils should be eliminated, but the commonest causes of failure were found in abnormalities of the urinary tract. If such abnormality was found, the help of a competent urologist should be invoked.

DR. A. S. WALKER (Sydney) said that Dr. Murphy's paper was essentially practical, and he had little to add as to the actual method of handling patients suffering from pyelitis. It was necessary to remember that "pyelitis" as an entity *per se* probably did not exist at all, except in some of the slighter cases of infection following an anatomical block of the ureter. In most cases the infection was truly a pyelonephritis. The importance of not overlooking the block in the ureter or other surgical lesion had already been emphasized, and, as Dr. Murphy pointed out, a urogram was simply carried out and might give essential information. Regarding the handling of acute pyelitis, the most important factors were those of rest (which included the even more important question of posture so as to encourage free drainage), diuresis, and probably alkalies. It would be noted that the last-mentioned was a reversion to a time-honoured treatment. It was interesting that the reason for the inhibitory power of a lowered reaction in the urine over bacterial growth was not clearly understood. As Osman pointed out, the infecting bacteria might grow in alkaline urine even though the patient recovered on alkalies. Dr.

Walker noted that Dr. Murphy agreed with Osman in his refusal to bow to the old fetish of purgatives in infections of this type. Dr. Walker would go perhaps further still and would base any active interference with the function of the bowels on the patient's comfort and the presence or absence of distension.

Touching the very important question of recurrence, Dr. Walker agreed with Dr. Murphy as to the wisdom of pursuing treatment after the acute stage, and of instituting the use of mandelates later on if there was any hint of the patient passing into the subacute or chronic stage. The reasons for recurrence were of great interest, especially as the cause sometimes appeared to be obscure. Dr. Walker suggested the following:

1. Reinfection, either because of the persistence of some other focus in the body which must be dealt with to obtain complete recovery, or the existence of a lowered state of resistance in the kidney itself. The question of local resistance was a most important one in a great many infective processes, for example, boils, and had been too much ignored by immunologists, whose attention tended to be centred on the reactions of the body fluids only.

2. A residual infective focus in the kidney. It should be noted that the area affected in pyelonephritis was really a septic infarct, and it was possible for a small softened area to persist and, by breaking down or extension, to cause a flare-up of the original condition. It was interesting too that a highly resistant type of colon bacillus was believed to be often responsible for these infections.

3. The presence of some other surgical lesion in the kidney or a block in the ureter. Regarding the treatment of chronic pyelitis, though Dr. Walker's experience had not been extensive, he agreed that in the mandelates they had a very useful method, which might succeed when others failed. Ammonium mandelate was often effective without further acidification, but should further acidification be necessary it might be noted that strong nitro-hydrochloric acid, 10 minims three times a day, had been found by a number of authorities more satisfactory than ammonium chloride. Though it was said that mandelic acid in practice did not appear to inflict any renal damage, Dr. Walker thought that it was well to be careful in patients who had a lowered renal reserve, and in this respect he mentioned particularly one common type of patient, the middle-aged or elderly hypertensive, usually a woman, with chronic pyelitis. The possible effect of a potent substance in concentrated solution had to be borne in mind, because the work placed upon the kidney was probably greater than if diuresis was encouraged, as it could not be when mandelates were used. Chronic pyelonephritis itself would cause degenerative changes in the kidney with consequent lowering of renal function. Dr. Walker was not sure whether the use of other antiseptics rested on a firm basis, but he felt that hexamine and some of the dyes seemed to be of value, though they were not comparable with mandelic acid. In regard to vaccines, his own views were destructive, as the very most that a vaccine could do would be to increase the immune-body content of the body fluids to some extent; but Dr. Walker did not believe that sufficient local immunity could be gained by these means to be of any practical use, and he could not say that he had ever seen a success that he could attribute to the use of vaccines. The so-called pathogen-selective culture method seemed to him entirely illogical, and he would be surprised if it survived.

DR. G. LENDON (Adelaide) asked Dr. Walker if he would agree that indication of pyelonephritis occurred only when some surgical obstruction was present.

PROFESSOR D. W. CARMALT-JONES (Dunedin) discussed the use of vaccines which he had employed for ten years. At first he had been most hopeful of their value and used them extensively. He seemed to have good results at the time with *Bacillus coli communis* injections, even using tuberculin vaccines. He did not agree with the other speakers as to the complete uselessness of vaccines, though perhaps their field of usefulness had diminished since the introduction of the mandelates. He thought that vaccines were not of much value unless carefully prepared and

given under personal supervision. It was really for this reason that he used them less, because he was not now able to get the same assistance as before in their preparation.

Dr. W. H. J. Moore (Melbourne) asked Dr. Walker what he meant by correct posture. Dr. Moore had seen cases of recurrent pyelitis which developed after a long motor journey, and here posture might be the cause. Similarly, posture might be important in the case of a patient confined to bed for long periods. To some extent the fact of stasis, which had been stressed by many writers, might be corrected by alterations in posture. He was prepared to consider that some patients might be aided by proper methods of standing. Deprivation of vitamins might result in epithelial changes, and this might be a further cause in chronic pyelitis. Abnormalities of the urinary tract might have to be dealt with surgically if infection was present. Mandelic acid was probably useless in infections with organisms other than *Bacillus coli communis*. Dr. Moore referred to a patient of his who took mandelic acid for four to five weeks, became cured of the pyelitis, but developed gastric disturbances. The urogram, though usually most helpful, might at times be distinctly misleading.

Dr. KONRAD HILLER (Melbourne) stated that in his experience acute pyelitis was very amenable to treatment. No mention had been made of intravenous injections of substances, such as acriflavine, which he considered most useful. He quoted the case of a man in the Melbourne Hospital who responded to this after the more usual methods had failed. Triptoflavine seemed more satisfactory than acriflavine. Chronic pyelitis with its frequent recurrence was a medical bugbear. While usually due to *Bacillus coli communis*, it might sometimes be caused by *Streptococcus haemolyticus*. He asked whether any member had had experience with "Prontosil" in the treatment of urinary infections. He found that his experience with mandelic acid had been very encouraging, but recurrence was common.

Dr. Walker, in reply, stated that he found it most difficult to distinguish between pyelitis and pyelonephritis. He preferred to consider all cases as being examples of lesser or greater degrees of pyelonephritis.

Dr. Murphy, in reply, agreed with Dr. Walker that focal sepsis had been over-emphasized as a cause, though there were exceptions. In reply to Dr. Hiller, he stated that he had had no experience of intravenous injections, but in one instance prostesaptine had produced dramatic benefit in a severe case of pyelitis with rigors and high temperature. This information had come to him indirectly, and he was not aware of the nature of the offending organism.

Indications for the Transfusion of Blood.

Dr. ERIC L. COOPER (Melbourne) read a paper entitled "Indications for the Transfusion of Blood". He began by tracing the development of the art of transfusion of blood and then drew attention to the widening field of usefulness of this procedure. He included a brief discussion of continuous drip transfusion and the use of stored blood in Russia and the Spanish Civil War. The records of the Melbourne Red Cross Transfusion Service were analysed and compared with similar figures from the London service.

Dr. Cooper pointed out that pre-operative and post-operative transfusions reduced morbidity and mortality and indicated an extension of the use of transfusion. He said that a larger proportion of donors was called in London than in Melbourne for patients suffering from hematemesis, probably owing to the teaching in Melbourne that hemorrhage might recur after transfusion. There was no foundation for this belief. The use of small volume transfusions was also condemned.

Before an operation upon a patient suffering from jaundice of the obstructive type a transfusion should be given, not only because of the danger of hemorrhage, but also

because of the risk of post-operative failure of liver function, which was partly due to anoxæmia.

In treatment of hemophilia one large transfusion followed by smaller volumes every three days should be given. For the acute stages of purpura 300 cubic centimetres every forty-eight hours were indicated, and if splenectomy was indicated in the chronic stages a large volume of blood was given before and after the operation. Dr. Cooper condemned transfusion to patients with macrocytic anæmia of the Addisonian type (pernicious anæmia) because of danger of fatal reactions and the more effective action of parenteral liver extracts.

Secondary aplastic anæmia required blood transfusion when the offending cause was removed. Primary (idiopathic) aplastic anæmia should not be the excuse for transfusion, except on social and economic grounds. Transfusion was often followed by subsidence of acute haemolytic anæmia (Lederer type); in familial acholuric jaundice transfusion was necessary during acute crises and as part of the procedure for splenectomy. Patients with leucæmia should never be given a transfusion.

Certain types of poisoning, especially coal gas, often required replacement transfusion.

Sepsis was not an indication for the transfusion of blood unless a severe degree of anæmia was associated with it. Dr. Cooper condemned immuno-transfusion. Transfusion in hopeless malignant conditions was contraindicated except as a means of rendering an anæmic patient suitable for excision of the growth. A patient suffering from severe burns or scalds should not be given a transfusion owing to the risk of renal failure.

Transfusion of human blood restored the fluid volume of the circulation, raised the level of serum protein, and by addition of red blood cells improved the oxygenation of the tissues. In some disease conditions blood transfusion aided the coagulation of extravasated blood. If these proven effects of transfusion were taken as a general guide in the selection of patients for whom transfusion of blood was indicated, then blood transfusion would be found to be a uniformly satisfactory procedure.

The abuse of blood transfusion consisted in its application to patients who were suffering from hopelessly incurable conditions. The physician finding himself without effective treatment at his disposal, attempted to escape from the morass of his own helplessness by advising the spectacular procedure of transfusion of human blood.

Dr. IAN WOOD (Melbourne) began his paper by stating that it was very difficult to decide when one should transfuse citrated blood in order to produce an immediate relief to the state of anoxæmia. He had found the following guiding principles of help.

The indications for blood transfusion were three. The first was severe anæmia causing immediate danger to life from anoxæmia. The second was severe anæmia which could be cured slowly by specific medical therapy (for example, anæmia from hemorrhage, iron deficiency anæmia and pernicious anæmia), but it was unwise to wait. Complications, such as pneumonia, might set in, or a further hemorrhage might occur. Perhaps a major operation might become necessary to arrest hemorrhage. The third indication was anæmia for which transfusion was the specific method of treatment or when other specific treatment had failed.

The danger of transfusing incompatible blood was very slight so long as both the direct and indirect methods of typing were used. Most reactions, such as rigors, pyrexia and circulatory collapse, were due to pyrogenic substances which were dissolved in tap-water. All apparatus should be thoroughly cleansed in specially distilled water and sterilization carried out by autoclaving and not by boiling in tap-water.

Dr. Wood said that transfusion was the best haemostatic known, and did not tend to produce a further hemorrhage, as was so commonly thought by clinicians.

A complete blood examination should be made on every case of severe anæmia to ascertain the cause. It was primitive medicine to give a transfusion blindly to a patient who was excessively pale.

After discussing the treatment of bleeding from peptic ulcer and haemorrhage of the new-born, Dr. Wood concluded by making a plea for the rational use of blood transfusion. Just as surgery was polluted by the presence of sepsis until the advent of Pasteur and Lister, so would transfusions be fraught with unnecessary risk to human life until physicians realized the dangers of injecting either incompatible blood or the pyrogenic substances of tap-water.

DR. G. V. DOYLE (Melbourne) said that he had been associated with this method of treatment for twenty years, ever since he had transfused whole blood from the radial artery to the vein of a woman with streptococcal septicaemia at the Women's Hospital, Melbourne. He had successfully treated patients suffering from septicaemia and sapsræmia, but for these he preferred whole blood rather than citrated blood. In regard to post-transfusion reactions, which Dr. Wood stated would never be entirely eliminated, he suggested to Dr. Wood to split open the rubber tube of his apparatus after transfusion to observe tiny clots which might be redissolved and injected into the blood stream at a subsequent transfusion. As a further practical tip to avoid clotting in the needle, he suggested removing the socket of the needle in a flame, as this was the place where clotting most frequently occurred. He remarked that it might not be entirely criminal to neglect to give a transfusion to a baby, because of the difficulty of carrying this out in general practice, especially by transfusion into the cerebral sinuses. He asked Dr. Wood for advice as to how this was best done. He had never had cause to change from a simple cross-agglutination test to any more involved procedure before transfusion.

DR. H. HUME TURNBULL (Melbourne) said that he was most interested in Dr. Wood's work which had been performed in his wards. The work had revealed to him his great ignorance of haemorrhage and its effects, and secondly, the tremendous importance of the haemoglobinometer as a guide to treatment, without which records of the blood pressure and pulse rate were comparatively useless. The blood pressure fell very late in the progress of the haemorrhage. By large blood transfusions, performed sufficiently early, the patient could be restored to the condition in which he was before bleeding occurred; he could then be assessed as a "surgical risk". Patients seen at a late stage of haemorrhage did not improve to the same degree, probably owing to the continued anoxæmia and its detrimental effect on the kidneys and other tissues. Dr. Turnbull's difficulty was to know the exact nature of the cause of bleeding and what he should ask the surgeon to do. He had been impressed with the remarkably healthy and normal appearance of patients following large blood transfusions. Although previously sceptical, he had realized during the last six years that there was little risk now from intravenous medication. He agreed that blood was the best haemostatic and that it did not increase bleeding. At the Royal Melbourne Hospital no difficulties were experienced in getting donors among the patient's friends, if the question of saving the patient's life was placed before them, bluntly if necessary.

DR. S. O. COWEN (Melbourne) stated that the Royal Melbourne Hospital staff was proud of Dr. Wood's work. He pointed out how much Dr. Turnbull had helped Dr. Wood and how Dr. Cooper had helped them through the work of the Red Cross Donors Service. Dr. Cowen stated that he had twice been faced with the problem of piloting a severe haemophiliac through a serious abdominal operation. He had learned that a small transfusion every forty-eight hours was usually sufficient to control the situation. It was necessary to make preparation beforehand by organizing a sufficient supply of donors. Dr. Cowen stressed the importance of avoiding transfusion in patients with pernicious anaemia who were very ill. He had experienced much trouble and even fatalities before the introduction of liver treatment, and even now, with every precaution, severe reactions were difficult to eliminate. Mortality in the Royal Melbourne Hospital from haematemesis was 23·4% before Dr. Wood began his work. Dr. Cowen was not in favour of immediate surgical

intervention, as he had seen lives saved by the immediate medical measure of a large blood transfusion. The surgeon did not know what he was to encounter, and might find it impossible to locate the bleeding point. Dr. Cowen confessed, however, that like Dr. Turnbull, he was "sitting on the fence" in regard to this problem.

DR. K. HILLER (Melbourne) asked whether Dr. Cooper was quite sure that blood transfusions did not increase the total coagulability of the blood. It was difficult to see why, if this were not so, a large vessel should suddenly cease to bleed as the result of the administration of a continuous blood transfusion.

Dr. Cooper, in reply, referred to the use of small transfusions to stop bleeding in severe anaemia, as he was satisfied that large blood transfusions could increase coagulability. There must be few cases, he said, in which citrated blood would not do what whole blood would do. If the citrate solution and the apparatus were properly prepared, no danger or disadvantages resulted from the use of citrated blood. Reactions would still occur, but no more than were seen with whole blood transfusions. In agreeing with Dr. Turnbull as to the value of the haemoglobinometer, he forecasted the recording in a few years of blood values as milligrammes of haemoglobin per 100 cubic centimetres of blood, rather than as a percentage. Speaking of the dangers of transfusion in severe pernicious anaemia, Dr. Cooper recalled that the first two patients whom he had treated in this way had both died in spite of satisfactory cross-typing. The same danger existed in carcinoma of the stomach. He held the view that it was justifiable to operate upon a patient with haematemesis, providing the blood could be maintained at a haemoglobin level of 60% to 70%, and that the surgeon should proceed immediately to perform the same surgical operation as he would perform if no bleeding had occurred. He considered it was a duty of the physician to get the patient back to this point. In regard to kidney failure, he held that transfusion was contraindicated when renal danger had already occurred or when severe renal failure was present, as the result of a long-continued anaemia. He thought, however, that blood might be given without danger to patients with a high blood urea as a result of bleeding. It was to be remembered that reactions were partially obviated by preliminary alkalization of the urine. Dr. Cooper said that he was impressed by the number of facts established by the pioneers of transfusion which had received recent confirmation.

DR. WOOD, in reply, thanked Dr. Cowen and Dr. Turnbull, and also expressed his appreciation of Dr. Charles Kellaway's assistance. He made it clear that he was condemning the two-drop, one-drop method of discriminating incompatible blood, and not any method which mixed the donor's corpuscles separately with the patient's serum. He found that it had been necessary only as a last resort to use the fontanelle as the route for giving a transfusion to babies. He could usually manage to introduce blood through veins at the elbow or above the malleoli. The blood was then siphoned in from the apparatus he had illustrated. He had experienced no severe reactions in the treatment by blood transfusion of a small number of patients suffering from pernicious anaemia.

Pituitary Disorders.

A discussion on disorders of the pituitary was opened by presentation of a paper that had been prepared by Sir Stanton Hicks; the paper was entitled "Disorders of the Pituitary Gland in Relation to Metabolic and Circulatory Disturbances". The author dealt particularly with the relationship between suprarenal cortex and the anterior pituitary. He stated that Falta in 1913 had drawn attention to regression of sexual function and secondary sexual characteristics in cases of cystic disease of the pituitary and atrophy of the suprarenal cortex. In 1914 Simmonds reported the complete clinical picture—high grade wasting and prematurely senile appearance, with loss of hair, dryness of skin and wrinkling of the face. Sir Stanton Hicks referred to a case reported by Dr. F. S. Hone, in which these characteristics had been

present. In this condition there was a failure of the circulation to adjust itself to vascular loading consequent upon muscular effort. Sir Stanton Hicks wished to draw attention to the beneficial effect of oral administration of whole suprarenal gland upon both the vascular defect and the deranged sugar and fat metabolism. Anterior pituitary dystrophy was much more common than the extreme form of Simmonds's cachexia would lead one to suppose. Four cases had recently been studied in Adelaide; all the patients were women in their second decade. These patients conveyed an impression of plumpness in comparison with the extreme cachexia described by Simmonds, sexual function was disturbed (amenorrhoea) and psychic change was pronounced. The subjects became irritable and easily fatigued; they appeared to be erratic in their behaviour. Hypoglycæmia, low body temperature and low blood pressure occurred in this condition; the pulse pressure was small and it was almost impossible to measure the diastolic pressure. Acrocytosis was present, and thyroid defect was seen in the characteristically lowered metabolism. The respiratory quotient was low and there was a distaste for starchy foods and for fat. Sir Stanton Hicks showed that there was a close relationship between this condition and Addison's disease. He referred to his experimental work in Addison's disease and on animals deprived of their adrenal glands, and also to the fact that the administration of whole fresh adrenal gland in both Addison's disease and pituitary cachexia not only increased appetite, but increased the intake of fat and carbohydrate. That treatment might be followed by extensive clinical improvement, which remained after the cessation of therapeutic measures, suggested that there was a stage of functional disorder which preceded the organic change, and which, if combated, reversed a vicious cycle, doubtless in the hormonal interrelation between adrenal and hypophysis.

PROFESSOR D. W. CARMALT-JONES (Dunedin) said that the subject was difficult because the pituitary gland influenced metabolism by hormones which stimulated other endocrine glands to produce other hormones; and it was variation in the latter which caused symptoms that were referred to the secondary glands, and the treatment of the latter was generally effectual.

In goitre clinics and diabetic clinics it was rare for pituitary disorders to be recognized, but it was probable that they were frequently responsible for thyroid and insular dysfunction, involving both basal metabolic rate and carbohydrate metabolism.

Water balance appeared to be controlled by the posterior pituitary; at any rate the use of substances extracted therefrom were valuable in the treatment of *diabetes insipidus*.

Fröhlich's syndrome, with its adiposity and abnormal metabolism of fat, was stated to occur with both pituitary and hypothalamic lesions; but the separate functions of these two organs were not yet clearly defined, and the pituitary body had to be considered as involved in the syndrome.

Circulatory disturbances were surely liable to occur when the adrenal gland was involved; thus the ovary inhibited the pituitary. In the absence of ovarian action, as at the menopause, the unchecked action of the pituitary was thought to stimulate the adrenal and to produce the flushes familiar at this period. It was possible that "essential hypertension" was due to pituitary action.

The hypertrophy of the heart and vessels and hypertension of acromegaly were recognized, but were rarely cited as producing symptoms. Vascular changes were evident in Simmonds's disease in the cutaneous striae.

DR. O. A. A. DIETHELM (Sydney) discussed the grades of pituitary dysfunction. He quoted a case of a young girl, aged twenty-one years, who complained of loss of three stone in weight in twelve months. There had been a history of adiposity earlier. The appetite was a little excessive; there were no visual defects. The menses began when she was twelve and had continued until she was fourteen years of age; then there had been a period of three to four years of amenorrhoea with later intervals of smaller losses with amenorrhoea. She had been con-

sidered to be suffering from a neurosis. X ray examination of the pituitary region revealed a contraction of the *sella turcica*, such as was found in Fröhlich's syndrome. The glucose tolerance showed a fasting level of 0.7% to 0.11% in one hour and 0.8% in two hours. The basal metabolic rate was -21%. The condition was looked on as a pituitary cachexia, when previously it had been regarded as a Fröhlich's syndrome.

DR. A. S. WALKER (Sydney) had recently had a case of Simmonds's disease showing sodium chloride retention. He disagreed with Professor Hicks that the acrocytosis was due to adrenal action. He thought it more likely to be venous than endocrine, but was keeping an open mind on the question. He wondered whether the oral administration of suprarenal extract would be effective here. He agreed that there were lesser grades of pituitary dysfunction and there might be a cyclical activity of the pituitary gland.

DR. IAN WOOD (Melbourne) said that there were many fat children between five and seven years of age who looked like sufferers from early Fröhlich's syndrome, but who at puberty developed normally. He stressed the necessity of not over-estimating the benefit of gland extracts.

DR. F. S. HONE, who had read the paper for Sir Stanton Hicks, said in his reply that the suprarenal gland extract given was prepared by Professor Mark Mitchell with great care, and he thought that this might have been the reason of its effectiveness as shown in Professor Hicks's results.

Tuberculin Therapy.

DR. L. B. ELWELL (Brisbane), in a paper on some results achieved by tuberculin therapy, pointed out that statistical comparisons of methods of treatment of pulmonary tuberculosis were notoriously fallacious, unless based on the period of survival of the patient. For the assessment of results in the treatment of pulmonary tuberculosis with tuberculin, only those patients were included (93 in all) whose treatment had commenced at least ten years previously, and who were treated for a minimal period of six months and mostly for more than twelve months. Sixty-three were returned soldiers, and all were accepted by the Repatriation Commission as suffering from pulmonary tuberculosis. Of the remaining 30, of whom 20 were females, the big majority had positive sputum; the few remaining, with "negative" or no sputum, were diagnosed as "positive" by radiograph and/or the subcutaneous tuberculin test in conjunction with physical signs. The large majority had been going downhill in spite of rest and every climatic advantage, as evidenced by progressive loss of weight and increase of symptomatology; the remainder were making no headway.

According to the Turban-Gerhardt classification, none of these patients was in Stage I. Of 12 in Stage II when treatment was commenced, 10 were known to be alive and well; two could not be traced. Of the 81, including 56 ex-soldiers, in Stage III, even counting as dead the three who could not be traced, 43 were still alive (31 ex-soldiers), or 53% (55% ex-soldiers) with an average survival period of sixteen years, and 68% were known to have survived for ten years.

Dr. Elwell said that the importance of utilizing an adequate survival period by which to assess results was shown by Wingfield's figures for Frimley Sanatorium. Here a certain selection of cases was made, inasmuch as only those patients were admitted who had a reasonable chance of being discharged fit for work. The immediate results were that 80% of patients were discharged fit for work. However, at the end of ten years, of Group II 45%, as against 83% or more of the smaller group of tuberculin-treated patients, and of Group III only 10%, as against 68%, were alive.

The 43 survivors of Stage III included eleven women, five of whom had married and at least three had borne children since their treatment and had remained very well. Five had suffered from urogenital tuberculosis at the time of treatment, one from chronic tuberculous meningitis and another from exophthalmic goitre; all had responded well to tuberculin.

Effusion was not noted during tuberculin administration, and it was of interest that Neumann, of Vienna, who used tuberculin in conjunction with artificial pneumothorax, had only 2% of patients with effusion as against the normal 70% to 80% in such cases.

Artificial pneumothorax was, however, rarely indicated if the best use was made of tuberculin; and in most of the cases under review artificial pneumothorax treatment would have been out of the question owing to the extensive and fibrotic nature of the pulmonary lesions; but for the purposes of comparison it was assumed that all were suitable for a trial of anterior pneumothorax. Burrell's results for all cases in which he had induced or attempted to induce artificial pneumothorax at least ten years previously showed that even in those bilateral cases in which less than one-third of the better lung was involved, only 18% of patients survived for ten years, whereas in those cases in which more than one-third of the better lung was involved, not one out of 36 patients survived for more than seven years, and all but two were dead within

two years. Of his patients with unilateral disease, 50% were alive after ten years. Such results might be contrasted with those achieved by tuberculin therapy. Of these, only 9 had unilateral disease, and only one failed to survive for ten years, and he lived for nine and a half, almost a 100% survival. Of the patients with bilateral involvement the survival rate for ten years was 69%, whether more or less than one-third of the better lung was involved.

DR. C. SUTHERLAND (Melbourne) discussed the use of tuberculin in asthma, and said that patients who did not react to the von Pirquet test did not do well. He considered tuberculin very useful for those cases in which other means of specific treatment were not suggested. He continued to give tuberculin once a month for a period of years.

PROFESSOR D. W. CARMALT-JONES (Dunedin) thought that only small doses of tuberculin should be used, although Carmac Wilkinson used large doses.

Section of Obstetrics and Gynaecology.¹

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President's Address.

PROFESSOR R. MARSHALL ALLAN (Melbourne), in his presidential address, gave a survey of the broad principles concerned with the control of maternal morbidity and mortality. The main problems facing the profession were: (i) the elimination of those conditions which determined the occurrence of puerperal infection; (ii) the recognition and treatment of the conditions responsible for the toxæmias and hemorrhage of pregnancy; (iii) the changes yet necessary to make the training in and the practice of obstetrics more effective.

Professor Marshall Allan said that as far as the sources of puerperal infection were concerned the work of Colebrook concerning the importance of droplet or spray infection had largely solved the problem, especially in those cases in which no interference had taken place. When infection had occurred, much yet remained to be done, especially in Victoria, before the necessary machinery was available for prompt diagnosis, isolation and treatment. One of the urgent needs in Melbourne was a separate isolation block for all cases of suspected or proven sepsis.

The effects of changing methods of practice were discussed—in particular mistaken notions regarding disproportion, breech presentations and the tendency at times to exaggerate the value of the life of the child over that of the mother. Professor Marshall Allan expressed the belief that the most important factor in the prevention of puerperal infections was the personal one. Unless there was a high standard of conscientious work, the use of masks, gloves and antiseptics would not prevent outbreaks.

The growing menace of induced abortions appeared to be due to a change in the social outlook to large families and to the modern desire for pleasure and freedom. A heavy responsibility rested on the public for allowing the

present position to continue. Increased tax exemptions might ease the economic factor, alleged to be the main cause; but the profession had a duty to perform by explaining the dangers and risks of such procedures and thereby assisting in tightening up the moral fibre of the community.

Professor Marshall Allan laid stress on the need for further investigation of the aetiology of the toxæmias of pregnancy, especially the part possibly played by deficiencies in diet. He thought that the number of deaths from *post partum* haemorrhage pointed to a failure by some to appreciate the principles of correct management of this stage of delivery.

Regarding the training of the obstetrician, Professor Marshall Allan expressed concern at the increasing numbers of students who were outstripping the available clinical material. The interests of future practitioners should be paramount, and if any reduction of cases was required this should be borne by nurse trainees. Professor Marshall Allan stressed the value of travelling scholarships and expressed the hope that the example set by Dr. T. G. Wilson's gift to Adelaide would stimulate seniors elsewhere to do likewise. Modern methods of travel were rapidly bringing all parts of the world into closer contact, and an exchange scheme between teachers in Australia and abroad was envisaged as a means of improving the standards throughout the Commonwealth. The opportunities for post-graduate training had been increased by the establishment of maternity wards in many country hospitals. The action of the Victorian Charities Board in insisting on specialist services at the main country hospitals was to be commended, for thus men would be encouraged to undertake obstetric responsibilities. Research was still hampered by the lack of facilities, while under present conditions university staffs were fully occupied with clinical teaching. The formation of the National Health and Medical Research Council aroused hopes that funds would be available for some of the pressing problems of toxæmia and sepsis.

¹The meeting of the Section of Obstetrics and Gynaecology with the Section of Medicine and the Section of Public Health, Preventive Medicine and Tropical Hygiene has already been recorded.

Gradual improvement would, in Professor Marshall Allan's opinion, come only when the many factors involved were tackled as a whole. The State had to realize that public health demanded money, but that the purchase price was worth while. Professor Marshall Allan was opposed to any scheme of complete governmental control; he held that the actual conduct of obstetrics should be left in the hands of the general practitioner. Until in each State all maternal deaths were investigated, as in New South Wales and New Zealand, they were largely groping in the dark. When this was done, more adequate coordination of existing services would be possible.

Professor Marshall Allan discussed the wider aspects of obstetrics which concerned the whole life of women, and laid stress on the need for better post-natal supervision. In conclusion he said that improvement was considered to be mainly connected with the problem of maintaining student and post-graduate training and practice as near to the ideal as possible.

Puerperal Infection due to Haemolytic Streptococci.

DR. JOHN CHESTERMAN (Sydney) read the opening paper in a discussion on puerperal infection due to haemolytic streptococci. Discussing the subject from the clinical aspect, he said that careful investigations had shown that about one-third of the deaths associated with pregnancy and child-bearing were due to infection and that in about 80% of these deaths the causal organism was the haemolytic streptococcus. Satisfactory methods of differentiating between various pathogenic and non-pathogenic strains of haemolytic streptococci had only recently been devised. Lancefield, by a precipitin reaction, had found at least seven groups, and with Hare had shown that the organism recovered from almost all severe puerperal streptococcal infections belonged to one group (*A*). Griffith, by serological methods, had found 27 types among strains recovered from various human infections, and almost all these types belonged to Lancefield's Group *A*. It had also been established that the same serological type might produce different clinical manifestations in different individuals, so that tonsillitis in one person, scarlet fever in another, and puerperal fever in a third might all be due to an identical organism. Pathogenic haemolytic streptococci did not normally inhabit the female genital tract, and it might be assumed that when a haemolytic streptococcus was found in association with puerperal fever to 101° F., it belonged to Group *A* and that some extrinsic source, which should be searched for when possible, was responsible for the infection.

Dr. Chesterman said that 286 cervical swabblings had been taken from parturient patients in the Women's Hospital, Sydney. There were two groups. The first included those taken on the third day of the puerperium from 100 consecutive deliveries. Haemolytic streptococci were recovered from five patients, four of whom had febrile puerperia (temperature 101° F. or over), and these four strains belonged to Lancefield's Group *A*. The fifth patient was afebrile and the organism was not a Group *A* organism. The second group included cervical swabblings from patients who had a temperature of 101° F. for which no extragenital cause could be found. The results are shown in the accompanying table.

Dr. Chesterman made the following comments:

1. The incidence among consecutive deliveries was six times greater than the 1 in 400 which Colebrook regarded as a standard to be attained and which had been attained by at least three British hospitals.

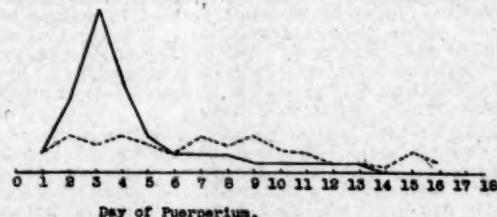
2. The incidence of haemolytic streptococcal infections among abortions was low.

To this series were added a further 13 consecutive cases of similar infections collected before routine swabblings were instituted, and the clinical histories of these 57 patients had been analysed. More than half the patients had normal deliveries without interference, and many no vaginal examinations. Infection manifested itself usually on the second, third or fourth day of the puerperium by a sudden rise of temperature, varying from 101° to 104° F., suggesting that the actual infection occurred at the time of delivery.

Table showing the Incidence of Morbidity (Temperature 101° F.) and of Haemolytic Streptococcal Infection in Three Groups of Hospital Patients.

Admissions During Eight Months.	Number with Temperature 101° F. During Puerperium.	Number with Haemolytic Streptococci in Cervical Swabbing.	Incidence.
Consecutive deliveries in hospital: 1,900	122 (6.3%)	31 (25% of swabs taken).	1.6%
Ptients admitted after delivery of viable child: 49	20	9 (47% of swabs taken).	19.0%
Patients admitted with abortion: 363	51	4 (8% of swabs taken).	1.1%

In most cases the infection remained localized to the uterus and the temperature subsided in a few days, so that this type of infection tended to be unrecognized as dangerous unless a cervical swabbing had been taken. The organism might invade tissues beyond the uterus, producing localized pelvic masses, generalizing peritonitis or septicæmia and its sequelæ. In treatment the use of sera was not advocated, but blood transfusions, repeated as necessary, were most valuable. Forty-one of these 57 patients had received treatment with sulphonamide preparations, and four of them died. These four patients were all admitted to hospital with advanced generalized infections. Of eleven patients in whom the infection



Graph showing comparative frequency of day of onset of fever reaching 101° F. and over. The continuous line represents haemolytic streptococcal infections; the dotted line represents other puerperal genital tract infections.

spread beyond the uterus, three had positive blood cultures and all recovered. The dosage advised was four to six grammes a day, given orally and at four-hourly intervals, but Dr. Chesterman said that this dose should be decreased if renal impairment was present or marked cyanosis developed. For prevention, the pregnant patient should be told of the risk of contact with other streptococcal infections, such as scarlet fever, erysipelas, otitis media, septic throats *et cetera*, and the doctor and nurse at confinement should satisfy themselves that they were not carriers of infection. Masking at all deliveries should be the absolute rule. Should the patient develop an abrupt rise of temperature to 101° F. early in the puerperium, a simple swabbing from the upper part of the vagina should be taken at once and sent to a laboratory for culture.

To provide laboratory facilities was the duty of health departments, whose officers must insist on immediate notification of a positive finding so that the necessary isolation of the patient and search for the source of infection might be undertaken. When the swabbing was "negative", notification was not necessary, as the other types of puerperal infection were nearly always autogenous and, although the patient should be nursed away from normal cases, the risk of spread was slight. By intelligent preventive measures and, above all, early recognition and immediate investigation of every puerperal infection due to haemolytic streptococci, the present incidence and mortality could and should be reduced.

DR. BEATRIX DURIE (Sydney) forwarded a paper in which she discussed the subject from the pathological aspect. She said that the control of puerperal sepsis was only part of a much larger problem, namely, the control of all infections due to the haemolytic streptococcus, since haemolytic streptococci of precisely the same kind as were found in puerperal fever were present in a great variety of commonly occurring septic conditions. The epidemic sepsis of other days had been eliminated by scrupulous care and the development of aseptic technique. A little more care, a few additional precautions, could eliminate the sporadic sepsis seen today. The chief source of infection was probably the throat carrier, since the human throat seemed to be the natural habitat of *Streptococcus pyogenes*. It was therefore imperative to examine throat and nose swabs from all midwifery attendants, especially those who had had recent tonsillitis or upper acute respiratory infections. But only one-third of the haemolytic streptococci found in human throats were pathogenic; a simple method of distinguishing pathogenic from non-pathogenic varieties was needed. Colebrook recommended the immediate recognition of puerperal infection by examination of cervical or lochial swabbings in all cases of pyrexia in the puerperium; in these, too, it was important to be able to differentiate pathogenic from non-pathogenic haemolytic streptococci. The majority of strains from definite infections belonged to Group A, the pathogenic group. Of the 48 cervical swabbings described in Dr. Chesterman's paper, 31 had been grouped by precipitin tests. Of the cases which did not belong to Group A, one was afebrile; the other three showed only minor degrees of pyrexia.

It was not always easy to decide whether haemolytic streptococci were present or not. Some strains produced less haemolysis than others. The type of media used was important. Horse blood should be used in making blood plates; human blood was next best. The blood of other animals was not suitable. The number of colonies found in throat swabbings varied; in cervical swabbings, haemolytic streptococci, if present at all, were present in large numbers, frequently in pure culture.

Many workers had attempted to devise methods of differentiating pathogenic from non-pathogenic haemolytic streptococci. The most important work was that of Griffith, who described 27 types of haemolytic streptococci within Group A. Lancefield described a precipitin test by means of which strains belonging to Group A, the pathogenic group, could be distinguished. When a haemolytic streptococcus isolated from a throat carrier gave a response to the Group A precipitin test, the carrier was regarded as potentially dangerous. This was not sufficient to identify a carrier as the source of infection in any particular case. Such identification was made possible by the existence of Griffith's types. These were serological types, established by the method of agglutination and agglutinin absorption. If they found that the infecting organism in a case of puerperal sepsis belonged, for example, to Griffith's Type 12, and if they found a Type 12 streptococcus in the throat of one of the patient's attendants or in her own throat, they had established a probable source of infection. The fact that 27 types existed made it unlikely that such a finding was mere coincidence. Unfortunately the work of typing streptococci was extremely tedious and difficult, requiring a well-equipped and well-staffed laboratory.

By systematic throat swabbing it was fairly practicable to eliminate infection from the labour ward. Of 85 throat swabbings taken from nurses in the Women's Hospital, Sydney, in June, 1937, nine showed numerous colonies of pathogenic haemolytic streptococci. Of these nine, eight had had recent severe upper respiratory infections. During the winter of 1936 (July to September), 104 throat swabbings were taken from nurses and students. Of 19 positive swabbings, 14, or 74%, came from persons who had had recent acute tonsillitis or other upper respiratory infection. It was evident that these people were the chief danger.

When no bacteriological service existed, swabbings could be sent by post to a central laboratory. Haemolytic strepto-

cocci had been grown from swabbings taken forty-eight hours previously.

It was easy to realize that throat carriers should be kept away from labour wards. But how were these carriers to be treated? This was a difficult problem, but no advance was made without some sacrifice; throat infections had to be dealt with seriously and adequately if sepsis was to be eliminated. Here, as elsewhere, the price of safety was eternal vigilance.

The haemolytic streptococcus was just as dangerous to the new-born as to the puerperal patient. At the Women's Hospital, Sydney, the neonatal death rate taken over a period of ten years was not higher than in other similar institutions. But since they had been on the look-out for them they had found several neonatal deaths due to haemolytic streptococci. The diagnosis was not always obvious and might easily be missed when routine bacteriological investigations and autopsies were not done.

DR. CHARLES W. ADEY (Melbourne) read a paper entitled "The Detection, Significance and Serological Treatment of Puerperal Sepsis due to *Clostridium Welchii*". He said that puerperal sepsis due to infection with the *Bacillus aerogenes capsulatus* (*Clostridium Welchii*) was now recognized as a well-defined clinical entity and as occurring more frequently than was formerly realized. The *Clostridium Welchii* was an anaerobe. Nevertheless it would, in a favourable medium, proliferate in a test-tube open to the air. Such a favourable medium was a veal broth to which a little meat had been added. A dead fetus and the attached products of conception, *in utero*, constituted a pabulum on which this organism might proliferate and form toxin with amazing rapidity. The toxin possessed two distinct activities. One was haemolytic; the other was necrotic when injected into living tissues and was apparently of general lethal effect.

In a meat broth the *Clostridium Welchii* would produce gas in quantity even under pressure. By attaching a manometer to a test-tube and hermetically sealing the system, Dr. Adey had found the gas produced at such a pressure as to lift 40 centimetres of mercury (approximately seven pounds to the square inch). The gas consisted of carbon dioxide, carbon monoxide, oxygen and hydrogen. The mixture was highly inflammable.

In the gravid woman infection was almost always initiated by manipulative interference with the course of a pregnancy. The fetus died. The *Clostridium Welchii*, introduced by the instrument or by the fluid or by the foreign body employed, proliferated and formed toxin. Once the organism established itself in the muscular wall of the uterus it initiated the menace of true gas-gangrene; it formed gas. It caused gangrene by the pressure of that gas upon the blood vessels and by its own capacity for disintegrating soft tissues. Thus there was caused a gangrenous necrosis of the muscle of the uterus itself. Toxin was absorbed. A gross destruction of the red blood cells took place. The liberated haemoglobin took part in the production of the jaundice and appeared in the urine.

Dr. Adey then discussed the serological prophylaxis of puerperal and post-abortal gas-gangrene. He said that it was well known that antitoxin would protect an experimental animal against the effects of a subsequent injection of toxin. It could now be demonstrated that antitoxin might inhibit the proliferation of an otherwise fatal dose of living organisms. Dr. Adey quoted an experiment of his own. An emulsion of living *Clostridium Welchii* was prepared, made up to approximately 4,000 million organisms per cubic centimetre and containing only negligible traces of toxin. Of this emulsion, 0.4 cubic centimetre was injected intramuscularly into the right thigh of each of twenty-four guinea-pigs. Of these guinea-pigs 12 were regarded as controls. In each of these controls there occurred within twenty-four hours oedema of the thigh and of the abdominal wall. Within at the most seventy-two hours they died. Into each of the other twelve guinea-pigs there was injected intramuscularly into the left (the opposite) thigh 0.1 cubic centimetre (70 units) of concentrated *Clostridium Welchii* antitoxin. This injection was made two hours after the inoculation of the culture. In these animals there might occur a

swelling at the site of inoculation of the culture, but this swelling invariably resolved. None of these animals died.

Dr. Adey said that this experiment constituted evidence from the laboratory that the antitoxin concerned was of prophylactic value. He understood that in certain cases of abortion and of labour the danger of infection by the *Clostridium welchii* might be foreseen. If foreseen, that danger might be averted.

DR. A. M. HILL (Melbourne) referred first of all to Group A haemolytic streptococcal infections. He said that he was sure that the papers of Dr. Chesterman and Dr. Durie would convey the impression that in severe and fatal puerperal infections due to haemolytic streptococci the causal organism is invariably of the Group A. This was not so. Although Group A was certainly the commonest and most pathogenic of the haemolytic streptococci which attacked mankind, the other groups could not be so lightly dismissed.

In 1934 Hare had recovered two Group B strains from the blood in fatal puerperal infections. In October, 1936, Coffey, of the New York State Department of Health, reported two Group B strains associated with fatal human infections, and three strains of Group C-G recovered from the blood in fatal human infections. At the Women's Hospital, Melbourne, prior to June, 1937, of 17 strains of haemolytic streptococci recovered by Miss Butler in puerperal and post-abortal infections, five were not of Group A. Two were of Group B, one each of Group C and Group G, and one was not classifiable. Three of these five infections were severe.

Dr. Hill then discussed therapy. He said that in "Prontosil" and the sulphanilamide compounds generally obstetricians had the most efficient therapeutic agent against Group A haemolytic streptococci that had yet been discovered. In the present state of knowledge, and particularly of uncertainty of supply in the Commonwealth, Dr. Hill urged the reservation of these compounds for Group A haemolytic streptococcal infections. This did not mean that sulphanilamide treatment should be withheld from the serious case pending bacteriological investigation. But once it was known that the infection was not of the Group A, there was no present justification for its continuance. It was mortifying to witness the indiscriminate absorption of these compounds by staphylococcal, pneumococcal and non-haemolytic streptococcal infections, while therapy in the genuine Group A haemolytic case was commonly delayed or vitiated by their shortage. It was, in Dr. Hill's opinion, a matter for serious consideration whether guarantee of supply should not be a government responsibility.

In Dr. Chesterman's table, which included deaths at the Sydney Women's Hospital due to organisms other than haemolytic streptococci, Dr. Hill had been struck by the absence of anaerobic streptococci. This contrasted with the experience in Melbourne. Dr. Hill knew that in many hospitals anaerobic cultures were not taken as a routine, and that thereby such infections were missed. Further, unless the anaerobic medium in use possessed free trypsin, probably only a proportion of available anaerobic streptococci would be recovered. Dr. Hill's results resembled more those of Schottmüller, who in 231 fatal cases of puerperal fever recovered haemolytic streptococci from the blood in 42 and anaerobic streptococci from the blood in 41. At the Women's Hospital, Melbourne, 80 blood cultures had been taken by Miss Butler from patients with post-abortal and puerperal infections. Haemolytic streptococci were recovered in nine cases, anaerobic streptococci in 14, and other pathogenic bacteria in 10.

Dr. Hill then referred to the subject of masking. He thought that its importance was still too often underestimated. While the present views on the significance of droplet infection prevailed masking was necessary. Paine, of Sheffield, had shown that it was necessary to guard against two types of droplets, one of high momentum and one of low momentum. High momentum droplets were projected in two streams from the mouth and nose, and reached their maximal concentration between ten and twenty inches from the face, or further, depending

on the explosive force. Low momentum droplets, due to convergence of the nasal and buccal streams, formed a fine spray which fell a few inches in front of the face and was liable to infect the front of the operator's gown and his gloves. A mask, to be efficient, should arrest both types of droplets. The mask therefore ought to cover both the nose and the mouth, and be designed to allow secure fastening under the chin. It should have a minimal air-gap at the sides. It should be comfortable to wear for long periods and be easily sterilized. The Jessop Hospital mask (which Dr. Hill demonstrated) was efficient on all these counts. It was of four-layered fine dental gauze and had been designed by Paine. It should scarcely be necessary to emphasize that the application of the mask should precede all other manoeuvres—laying out of instruments, toilet of hands *et cetera*.

Lastly, Dr. Hill discussed *Bacillus welchii* infection. He said that in Australia this type of infection was a grave problem, particularly in association with criminal abortion. Those who were familiar with these cases knew the common hopelessness of therapy, however intensive, once the clinical signs had become established. At the Women's Hospital, Melbourne, in the last four and a half years there had been 77 cases with 49 deaths. Twelve infections were puerperal and 10 patients died; 65 were post-abortal and 39 patients died. In all the puerperal and 27 of the post-abortal cases clinical signs had become evident only after admission of the patient to hospital. It was true that in the majority signs developed within a few hours, most commonly five to fifteen hours, of the patient's arrival at hospital, and that these infections were in a subclinical stage of incubation on admission. But it was precisely these few hours that might spell the difference between death and recovery in an infection as rapidly fatal as that due to *Bacillus welchii*. Not one of the women reported by Dr. Hill had received prophylactic antitoxin.

For some years it had been the custom at the Women's Hospital to give *Bacillus welchii* antitoxin prophylactically to puerperal patients showing factors known to predispose or contribute to *Bacillus welchii* infection. These factors were: dead *fetus in utero*, long-standing rupture of the membranes, destructive operations, vaginal plugging, tubal induction, "failed forceps", intrauterine manipulations, and cadaveric and offensive discharges. In no such case in which prophylactic antitoxin was given had *Bacillus welchii* infection occurred. Dr. Hill therefore made the following plea: First, that a keener awareness of the type of puerperal case in which prophylaxis was advisable should be developed. Second, that of all patients suffering from septic abortion who were admitted to hospital, and who were thought unsuitable for immediate emptying of the uterus, a fixed proportion, say every alternate patient, should be immediately given 20,000 international units of *Bacillus welchii* antitoxin. In this way, within one or two years, information of scientific and social value would be gained. One thing that had not been done was to educate public opinion in this matter.

DR. LUCY BRYCE (Melbourne) said that she was in agreement with Dr. Durie on the difficulties in tracing the source of infection. Dr. Durie stated that one-third of haemolytic streptococci from throat swabs belonged to Group A. Hare had reported examination of throat swabs from representative sections of the population. He had found that among individuals not suffering from infection, the percentage of Group A haemolytic streptococci was 7. This 7% formed one-third of the total number of streptococci recovered. Dr. Bryce had recently investigated an outbreak of sepsis in a private hospital in Melbourne. One patient gave a positive blood culture and two were suffering clinically from septicemia. She had taken swabblings from 32 contacts among the nursing and medical staff, and found not less than 27% were infected with Group A haemolytic streptococci. Two months later she had taken swabblings from the same staff and then, in 65 swabblings, found only one person harbouring pathogenic streptococci. This investigation showed how infection could spread from one case, and pointed strongly to the need for isolation. The mere finding of a Group A

streptococcus in a contact did not prove that this contact was the source of infection, and less unnecessary distress might be caused to nurses or students if care were taken not even to make that inference. Dr. Bryce considered that in taking a throat swabbing the posterior naso-pharynx should be swabbed as well as the tonsil. Using a guarded swab, she had recovered many streptococci from the posterior naso-pharynx; in practice one swabbing sufficed, provided both these areas were swabbed.

In dealing with carriers, each case required individual treatment. Nurses should have swabs taken before commencing their training. In regard to the infection in the new-born infant, in 1928 Dr. Bryce had investigated an outbreak of sepsis in a Melbourne hospital in which three babies were infected, two fatally. There was an interval of one month between the infection of a woman patient in the hospital and infection of the third baby. The organism recovered was an unusual type, and consequently Dr. Bryce had been able to say that the same type of streptococcus was responsible for all infections found. On swabbing the nursing and medical staff of the hospital, this same organism was found in pure culture in the antrum of one of the nurses. Many were enthusiastic about Lancefield's Group A organisms, but Dr. Bryce thought that much more work remained to be done with regard to classification of streptococci.

DR. F. BROWN CRAIG (Sydney) stated that a lot had been said about the carrier and the organism being found in the throats of contacts; he thought that the source of infection might just as well be the throat of the patient herself, and consequently a throat swabbing should be taken from each patient infected. At the Royal Hospital for Women, Sydney, masking of nurses was insisted on during all treatment of patients in the puerperium. Dr. Craig referred to the routine swabbing of the throats of medical students, and said that a serious position might arise for the student if he was delayed for a year in his medical course because he was found to be harbouring pathogenic haemolytic streptococci. A position might arise in which students might institute legal proceedings against a hospital for interfering with their medical course. His hospital authorities intended to get legal advice in regard to this point.

DR. A. L. WATSON (Sydney) said that, as he had left Queen Charlotte's Hospital only about seven weeks previously, it might be of interest to outline the method of treatment with sulphanilamide adopted at that institution. In severe cases 3-6 grammes were given every day by mouth and 20 to 40 cubic centimetres intramuscularly into the back. This treatment was continued for four days. In less severe cases the injection was withheld. At Queen Charlotte's Hospital administration of sulphanilamide was commenced in a suspected case before the bacteriological findings were available. The treatment was not discontinued too soon, as relapse had sometimes been noted. When a second administration of the drug was started it did not appear to have the same effect. The patient was allowed to have all types of food, including stout. Mortality in haemolytic streptococcal infections had been reduced to 3·5%.

DR. N. McARTHUR (Melbourne) said that one of the difficulties in connexion with devising an efficient mask was to avoid the steaming of glasses. He had found that the difficulty of steaming of glasses caused by most types of mask could be avoided by not tying the lower string around the neck.

DR. G. A. THOMPSON (Perth) said that for some years he had worn a mask designed by Collier. This was made of a thin waterproof material, and along its upper border was a thin strip of malleable aluminium that could be moulded around the nose. He said that in Perth most puerperal sepsis occurred in private hospitals, and he thought that the inspection of these hospitals should be more regularly enforced. He thought that infection could be spread from one to another by means of bed-pans; there should be one bed-pan for each patient, or else complete sterilization after each usage should be the rule.

DR. R. F. MATTERS (Adelaide) agreed that repeated blood transfusions were valuable, but he asked how they had

their effect. When in New York he had met Dr. E. P. Watson, who was an enthusiastic advocate of repeated treatment with blood transfusions. Dr. Matters had recently had a patient who made no response to treatment with "Prontosil", but her temperature had now become normal after five blood transfusions.

DR. E. BRETTINGHAM MOORE (Hobart) said that it would appear from the remarks of the previous speakers that all that was necessary was to find an efficient method of masking and this would prevent infection; but he did not think enough attention had been directed to the effect of manipulation and trauma during the conduct of labour. He would like to eliminate the risk of infection from bed-pans and agreed that adequate sterilization should be the rule. He also had found that chronic salpingitis might be the focus leading to infection after childbirth; organisms from the bowel might also lead to infection. He had treated nine patients with "Prontosil", eight of whom recovered. Owing to the difficulty of getting supplies of this drug, administration had been stopped as early as possible, and sometimes this had led to a relapse in the patient's condition, but the patient had always responded again to further administration of the drug.

DR. R. E. MAGAREY (Adelaide) said that he had been impressed with the results obtained by "Prontosil" treatment. He had always used *Bacillus welchii* antitoxin as a prophylactic when much manipulation had taken place, or when death of the foetus occurred during delivery.

DR. R. BEARD (Adelaide) thought that perhaps the importance of masks in reducing sepsis was exaggerated. When he looked back to the good results obtained before masking became a routine, he wondered whether any great improvement would result from the use of masks. He thought that infection could occur during the puerperium, and that nurses, when swabbing the vulva, should always wear gloves.

DR. MARY DE GARIS (Geelong) stated that analysis of her records showed that patients with kidney disease during pregnancy were more likely to have a febrile puerperium, and she thought that organisms flourished more freely on albuminuric soil. In her opinion, most patients suffered from mild pyelitis during pregnancy, and she thought that, if neglected, this might lead to septicaemia. As a prophylactic she gave each patient three large doses of "Radiostoleum" or "Adexolin" daily during pregnancy. After a labour requiring much manipulation she did not stitch any perineal tear. She did not wear a mask.

PROFESSOR MARSHALL ALLAN (Melbourne) said that he thought that governments would have to be roused to provide necessary facilities for quick examination of cervical swabbings. As they were willing to pay for swabs in venereal disease and diphtheria, why should they not pay for recognition of streptococcal infection. He himself was doing his best to push this matter in Victoria. He agreed that masking was not everything, but should be in routine use. This was in keeping with the old adage: "Clean hands, clean vulva and keep your mouth shut."

In reply, Dr. Chesterman stated that he realized that in his and Dr. Durie's papers the impression had been given that Group A streptococci were invariably found in severe puerperal infection. He knew that organisms of other groups had been found in a few cases, but had not seen as many cases reported as Dr. Hill mentioned.

In regard to infections with anaerobic streptococci, in the series of cases reviewed in his paper the causal organism had been found in all fatal cases except one, that of a woman admitted to hospital after delivery. In this patient no organism had been grown, and on two occasions an attempt to recover the anaerobe from the blood stream had failed. Anaerobic cultures were made only when a causal organism had not been found aerobically. This was due to limited laboratory facilities.

During eight years at the Women's Hospital, Crown Street, Sydney, he could remember seeing only one patient infected with *Bacillus welchii*. It did not seem likely that the causative organism of a death from this infection would go unrecognized, so he concluded that it must be

a much more rare type of infection in Sydney than in Melbourne.

Some members had spoken of trauma and manipulations as a big factor in sepsis, yet in at least half of the 57 cases reviewed in his paper there had been no interference at all; in many of them not even a vaginal examination was made. This and the fact that in most instances onset of fever occurred on the second, third or fourth day of the puerperium pointed to droplet infection as being the most important factor.

In regard to throat swabs, the routine practice at the Women's Hospital, Sydney, was to take swabbings from all students and new resident medical officers before they commenced work in the labour ward. All new nurses had throat swabs taken before they commenced their training. In one or two instances a pathogenic streptococcus had been found in a student's throat, with the result that this student had lost time and had been inconvenienced in his course. The hospital authorities had already sought legal advice about their rights to prevent any student from attending patients if they saw fit, and had been advised that they were fully entitled to do so.

Dr. Matters had asked how blood transfusion had any beneficial effect. Dr. Chesterman suggested that this was possibly due to the introduction of leucocytes in the new blood. He had noticed that when a high leucocyte count was present in septicaemia the prognosis was good. It was thought that finding possible sources of infection in these cases was possible only by typing organisms by the Griffiths method. It was hoped that this would be done in the future, provided greater laboratory facilities were available.

Sterility.

DR. KENNETH MACKENZIE (Auckland) read a paper on sterility. He said that ten years previously, as an examiner in gynaecology for the University of New Zealand, he had set the question: "How should a case of sterility be investigated and what treatment given to the various causes that might be found?" At that date this was a question to which a straightforward answer could be given. A decade later Dr. Mackenzie would hesitate to put it, in view of the vast amount of as yet undigested new matter that had been put forth in the field of reproductive physiology. In 1927 the investigation had been concerned with the grosser genital defects in each sex, and in the male the determination of the presence of active living sperms in the seminal fluid. The vaginal secretion was tested for acidity, the cervix examined for inflammatory conditions, the development of the body of the uterus and its position were determined. The adnexa were palpated for swellings indicative of chronic infective disease. Rubin's test for tubal patency was a comparatively new procedure. Certain constitutional disorders, notably adiposity, were taken into account.

Treatment in the female consisted in the use of alkaline douches, in the application of antiseptics or the cautery to the unhealthy cervix, in a rather empirical dilatation of the cervix and curettage of the uterus, and in the operative treatment of displacements. Efforts were being made to remedy tubal occlusion by plastic operations on the tubes, and valuable information was becoming available in such cases from the use of lipiodol and X rays.

Each method of treatment was followed, *post hoc* or *propter hoc*, by a percentage of successes, but there still remained a larger percentage of apparently healthy couples in whom the cause of sterile union could not be determined, and to the solution of this and other mysteries of reproduction the efforts of a number of investigators had been strenuously applied in the intervening years. Their researches had resulted in much more definite knowledge of the physiological changes of the menstrual cycle and of the time relationship of the shedding of the ovum, and had opened up a vast field of endocrinology in relation to sexual function. The magnitude and complexity of the examination of a sterile pair and their treatment had enormously increased, but with, it was claimed, compensatory results. It was for those present to determine their duty to their patients in this matter. On the one part they had to refrain from costly and complicated methods, unless they were most surely based; on the

other, they had to assure themselves that they were not lagging behind and so depriving patients of their rightful help. Individually it was often difficult to assess the true value of reports, so apt to be rose-tinted with the enthusiasm of the observer, and it was then that the value of conference and of the pooling of experience was seen.

In discussing the investigation of sterility, Dr. Mackenzie said that realization of the outstanding importance of hormones in the functional activity of the generative organs called for a corresponding care in the estimation of the endocrine factors in sterility. The thyroid, the pituitary and the adrenal glands had to come into review, not only as single organs, but in regard to their interactions. Defect and excess of the thyroid were the most readily recognized and estimated, either clinically or by means of the basal metabolic rate. The anterior pituitary gland had assumed pride of place in the hormonal control of the gonads, with its oestrogenic and luteinizing hormones influencing alternate phases of the ovarian follicle. To the pituitary was ascribed the stimulus which produced development of the ovaries and uterus in the female and the penis and testes in the male. Failure of growth resulting from gross hypopituitarism was seen in Fröhlich's syndrome, and less degrees of hypoplasia and hypofunction resulted from milder deficiencies. Two types of gonadal disturbance were named primary and secondary hypogonadism. In the former there was an adequate production of pituitary gonadotropic hormones, but a defective response on the part of the gonads. In the latter the pituitary hormones were lacking. The diagnosis of these states was made by quantitative tests for gonadotropic pituitary secretion and of ovarian follicular secretion in the urine, the latter being defective in both forms, the former only in secondary hypogonadism. It had been stated that pituitary deficiency ranked first among the endocrine causes of sterility, accounting for more than 60% of cases. The adrenal glands came into the picture in that over-secretion of their cortical hormone tended to the production of male characteristics in the female, culminating in the extreme virile changes of cortical adenoma or adenocarcinoma.

Dr. Mackenzie said that he had recently reported a case of hyperadrenalinism in a girl of eighteen years, who showed adiposity, heavy growth of hair upon the face, and scanty and irregular menstruation. Partial adrenalectomy was followed by a return to normal menstruation, loss of weight and a slight diminution in hirsutism.

It was a rare thing to see a high degree of glandular dysfunction in sterility patients, the great majority of whom appeared to be average normal people. The lesser defects would almost certainly vary from time to time in the extent of their departure from normal. The elaborate investigations of Meeker, of Boston, made him believe that in functional sterility multiple factors were the rule, and that results would not be obtained from treatment if it was limited to a single factor. He therefore required that a sterile couple should undergo an investigation occupying at least a week in a specially organized clinic. He reported that both partners showed defects in a high percentage of cases, and that there was an average of about five defects per case. The complexity of his procedure was beyond the powers that the ordinary gynaecologist could command and that the purse of the ordinary patient could sustain.

Dr. Mackenzie also referred to that interesting phenomenon, anovulatory menstruation, described by Novak. In this the Graafian follicle began to mature and produced the oestrogenic substance required for proliferative phase of the endometrium. For some reason, perhaps undue density of the tunica of the ovary, it failed to rupture, but kept on beyond the stage of usual maturity, until the ovum died, the granulosa degenerated, production of oestrogenic substance ceased and after an interval bleeding occurred, which simulated normal menstruation. It was not so, for owing to the lack of *corpus luteum* hormone the endometrium had not proceeded to its secretory phase. Histological evidence of this provided the diagnosis.

Discussing treatment, Dr. Mackenzie said that a number of statistical inquiries had recently been made into the results of plastic surgery of the Fallopian tubes and of

implantation of the ovary into the uterus. These had shown that much improvement in the technique was necessary before any large number of successes could be gained, and this would accord with the experience of most gynaecologists. A point to be stressed in the tubal cases was the necessity for repeated post-operative inflation of the tubes in an attempt to maintain their patency. The removal of a thickened ovarian tunic or cystic accumulations had also been disappointing in results.

Of particular interest and of great simplicity was the Knaus-Ogino theory of a short phase of fertility in the estrous cycle. The theory was based on the occurrence of ovulation on the fifteenth day before the commencement of the next menstrual flow. It was believed that the fertilization could take place only during a few hours succeeding the shedding of the ovum. The life of the spermatozoa in the female genital tract was estimated at not more than forty-eight hours. Therefore, union of a sperm and ovum occurred only with coitus limited to the forty-eight hours before and to a few hours after ovulation. While this theory could not be accepted entirely, for there appeared ample and definite evidence of pregnancy following a single coitus at other dates in the cycle, yet it was relatively accurate, and in America at least special calendars indicating "dangerous days" were widely and, it was said, effectively used by those desirous of exercising birth control.

It could therefore be accepted that there was at any rate an optimum period for conception, and it was a simple matter to use this fact in helping sterile patients. Recently in cases of sterility Dr. Mackenzie had instructed patients that coitus should take place at this period. One success following this advice proved nothing, but was worth recording.

A woman, aged thirty-six years, had consulted Dr. Mackenzie in March, 1935, regarding sterility of ten years' duration. Examination of her and of her husband failed to show any cause for sterility. There were abundant active sperms, the Fallopian tubes were patent and examination of the premenstrual endometrium showed a normal secretory phase. The optimum time was described to them in February, 1936. Pregnancy occurred in September, and she was delivered of a living child at term.

It was interesting in this connexion to note a statement that had been made to the effect that a woman with a consistently short cycle, 21 to 26 days, rarely, if ever, became pregnant.

Dr. Mackenzie went on to say that the endocrine treatment of sterility had not yet reached a stabilized condition either as to the substance necessary or as to its dosage. Thyroid extract stood as the most reliable in its effects. The restoration of normal menstruation when there was amenorrhoea or hypomenorrhoea, was to be aimed at by the use of ovarian and pituitary hormones, for surely there would be then a greater chance of pregnancy occurring. The majority of sterile women had little or no deviation from normal menstrual function, and the hormone treatment of these was still very vague. Even vaguer still was the use of "stimulating" doses of X rays to the pituitary, thyroid and ovaries.

DR. R. F. MATTERS (Adelaide) said that the causes of sterility might be classified as follows: (i) male deficiencies, including gonad irregularity and duct obstruction, 26%; (ii) female under-development, antefixion and cervical stenosis being responsible for 16% and ovarian deficiency for 10%; (iii) endocervicitis, 15%; (iv) tubal occlusion, 33%. These figures had been given by Carey after investigation of a large series of cases.

Male deficiency, Dr. Matters said, might be due to obesity, to alcoholism, to fatigue, or to sexual excess. Sometimes it was due to developmental failure in the testis. More commonly it was due to blockage of the ducts, either from disease or from trauma. Investigation of all cases of sterility should include examination of the semen; not only were motile spermatozoa necessary, but a viscous type of semen was known to be of higher fertility.

Discussing female under-development, Dr. Matters said that when the vulva was inspected, an undeveloped condition of the labiae *et cetera* would indicate genital hypotrophy; this would be confirmed if a small anteflexed

uterus with a long cervix was found. Patients with this condition had in some instances become fertile after receiving large amounts of folliculin, followed by dilatation of the cervix. The folliculin improved uterine development, Dr. Matters said, and dilatation overcame cervical stenosis, which appeared to militate even against spermatozoa.

Dr. Matters went on to say that ovarian deficiency might be due to a failure in the normal cycle and to a lack of ripening follicles. It might be due to thickening of the tunica albuginea, which prevented rupture of the follicle, no ovum then being provided for fertilization. These patients had a considerable hyperesthesia of the lateral abdominal wall, and considerable pain midway between the menstrual periods. Dr. Matters said that he had had success with patients of this type by removing long wedge-shaped pieces of the fibrosed tunica albuginea; one patient had subsequently had two children, having been sterile prior to this operation.

Graves had associated fibroid growths with deficient follicular development, Dr. Matters said. Two patients had recently been treated surgically, in whom the uterus was almost replaced by fibroid growths, which incidentally also caused acute dysmenorrhoea. Dr. Matters said that after the fibroid growths were removed (sometimes by hysterotomy) the uterus recovered; recovery might be accelerated by the use of injections of follicular hormone. Vitamin E had first been mentioned by K. M. Evans.

Speaking of endocervicitis, Dr. Matters said that this might follow abortion or infection, especially gonorrhoea. Gonococcal infection was probably present if on inspection Sanger's macula was seen on the vulva. If there was an excessive secretion from the cervix, the leucorrhoea caused sterility. Laceration and infection might also cause sterility, particularly if the external os gaped. All these conditions caused what Carey called "viscosity blockade" and might be treated by simple cauterization of the cervix, by coagulation, or by diathermy. This treatment, however, might cause stenosis or a flare-up in the tubes if it was carelessly carried out. The method used by Schlink, of Sydney, was to enucleate the cervical canal; that used by Bourne, of London, was to produce a necrosis of the cervical canal by the insertion of clay applicators, previously soaked in a saturated solution of zinc chloride.

Referring to tubal occlusion and uterine displacement, Dr. Matters said that retroversion of the uterus was frequently blamed for sterility, and that many patients underwent operation for shortening of the round ligaments with no beneficial result. Some of these patients had a vaginal wall which allowed the semen to escape after coitus, and quite often the simple procedure of placing the foot of the bed on blocks was sufficient to keep the semen in the vaginal vault after coitus. It was also as well to suggest that coitus take place between the sixteenth and twentieth days before menstruation. Dr. Matters said that Wilfred Shaw and Corner had shown that at this time the ovum was extruded from the follicle and found its way into the tube, and therefore this was the period of maximum fertility. Tubal occlusion was responsible for 33% of the cases of sterility in this series; Rubin had made this discovery some years previously, when he introduced his method of tubal insufflation.

Dr. Matters said that the cause of blockage in the majority of cases was salpingitis following illegal abortion, gonorrhoea or local peritonitis resulting from infection of the appendix *et cetera*. Chocolate cysts were also occasional causes; Dr. Matters had had three such cases, in which sterility was the result of massive adhesions causing stenosis of the tubes. In some patients obstruction was not complete, and might be overcome by slowly increasing the intratubal pressure by means of insufflation up to 200 millimetres of mercury; several patients had required nothing more than this. Insufflation was best carried out about sixteen days before menstruation was anticipated, and coitus should take place that night or the following night. When the obstruction was not overcome by insufflation, further information might be obtained by the injection of Iodipol into the uterine cavity under pressure, after which an X ray photograph should be made. This would show the site of the obstruction, and if this was

at the fimbriated end of the tube, salpingostomy might be performed. Dr. Matters said that many successes had been claimed for this method, but he had been able to discover only two cases of pregnancy following salpingostomy.

When the tubes were occluded near the cornual ends, Dr. Matters considered it improbable that the patient would become pregnant. If she desired it, however, the abdomen might be opened and the healthier ovary freed as far as possible. Next the posterior aspect of the uterus was incised right into the peritoneum; into this incision the ovary was implanted by sutures passing through the ovary and into the endometrium, then returning from the endometrium through the muscle and the peritoneum on either side, after which the ends were tied across the incision so as to close the peritoneum over the ovary. Dr. Matters said that of several patients whom he had treated by this method, he knew of only one who had become pregnant, and of one more who considered that she was pregnant at the present time.

Dr. Matters stressed the point that cases of sterility associated with old salpingo-oophoritic conditions should not be lightly regarded from the point of view of treatment; the gravity of the situation should always be explained to the patient, because of the operative risk and because of the unlikelihood of pregnancy occurring subsequently to the operative procedures.

DR. BRIAN SWIFT (Adelaide) showed the meeting a new portable tubal insufflator designed by Rubin. He said that this machine recorded on a graph pressure reached in the tubes. The graph record of each case could be kept. This graph often indicated the presence of a spasm of the tube which might require a pressure of 180 millimetres to overcome it. By treating the patient with repeated insufflations it was often found that this spasm was overcome by lower pressure at each succeeding insufflation. Dr. Swift had found on some graphs regular wave movements of small amplitude, indicating the presence of a peristaltic wave in the tube. He had used the method of repeated tubal insufflations as a therapeutic measure in several cases, but they were too recent for him to determine whether the desired effect would be obtained.

DR. R. W. CHAMBERS (Melbourne) considered that in dealing with sterility there was too much tendency to concentrate attention on the pelvic organs only. In his opinion, general causes were as important as local causes. He thought that septic foci, such as unhealthy tonsils, could cause sterility, and had seen attention to these foci followed by pregnancy. He wished to ask how soon after the operation of salpingostomy was it wise to undertake tubal insufflation.

DR. B. E. WURM (Adelaide) said that the causes of sterility could be broadly classified into two main groups: unspecific or asexual, and specific or genital. The latter group he subdivided into three. The first included those in which there was present a positive history and positive finding on examination. This group included infections, which might be ascending, descending or blood-borne. The blood-borne infections included such conditions as tuberculosis, scarlet fever, mumps and sometimes measles. In the second group there was a positive finding but a negative history. This included the hypoplastic and hypo-functional types of genital tract. In the third group both the history and findings were negative, and this group was often the most difficult with which to deal.

When a test was made for normal spermatozoa there should in addition to normal structure be adequate motility and sufficient propelling power. This propelling power might be tested by placing a cover slip over a drop of semen, and at the side of the cover slip placing a drop of normal saline solution. This caused a flow of fluid from under the cover slip outwards towards the saline solution. It was then possible to observe under the microscope whether spermatozoa were able to propel themselves against this flow.

DR. R. BEARD (Adelaide) referred first to the factor of coincidence. He quoted the case of a woman who had recently consulted him for sterility after seven years of marriage. He did not advise immediate treatment or

investigation, but within a few weeks she had returned and asked him why he did not tell her that she was pregnant. He had removed a small fibroid from the fundus of the uterus of an apparently sterile woman, and shortly afterwards this patient had become pregnant. He could not conceive that this fibroid, by its nature, could have been responsible for the sterility. Dr. Beard also stressed the tendency of patients to fall pregnant when approaching the climacteric after a long period of sterility. He agreed that probably general constitutional conditions played a greater part in causing sterility than was suspected. With regard to the operation of ovarian transplantation, he wondered whether the slight chance of pregnancy following this was worth the risk attached to the operation.

DR. F. BROWN CRAIG (Sydney) said that in his experience there was no royal road to overcoming sterility. Every possible avenue must be explored. He referred to those cases in which sterile partners, after separation and remarriage to other partners, would each prove to be fertile. He was not fully convinced of the value of Rubin's test or salpingostomy. This type of procedure might be followed by an ectopic gestation. He had obtained good results by clearing up any local inflammatory condition, such as endocervicitis, and the administration of an oestrin preparation in its correct time in the menstrual cycle. Coitus should be avoided for a short period, and the patient should be told of the most fertile period in the menstrual cycle, namely, from the fifteenth to the twelfth day preceding the next expected period.

DR. K. MACKENZIE, in reply, said that a greater proportion of patients in his practice had given negative histories and negative findings. He had not found as great a proportion of cases associated with gross pelvic lesions as might be expected. In a recent case he had performed tubal insufflation three days after an operation of salpingostomy and had followed this up with an injection of lipiodol in the tube twelve days later. Referring to Dr. Brown Craig's remarks about apparently sterile persons becoming fertile with other partners, he thought that if, for example, in the aggregate ten factors were required to produce pregnancy and the sterile partners between them could supply only eight of these, it might well be that when they remarried their new partners could make up the deficiency in each case.

Carcinoma of the Cervix from the General Practitioner's Point of View.

DR. F. BROWN CRAIG (Sydney) read a paper in which he discussed carcinoma of the cervix from the general practitioner's point of view. He said that in the report of the Eighth Australian Cancer Conference one of the tables showed that deaths from cancer of the female genital organs per 100,000 of mean population had increased within the Commonwealth from 15.3 in 1908 to 22.0 in 1935. In spite of this disquieting evidence, very definite progress had been made within the last ten years in the treatment of these conditions by means of radium and deep X ray therapy. This improvement applied preeminently to the treatment of carcinoma of the cervix. What had formerly been one of the most unsatisfactory problems in gynaecology was now less formidable in its solution. With the cooperation of the general practitioner still better results could be obtained by the recognition and removal of predisposing causes of cancer of the cervix and by more accurate diagnosis of the disease in its incipient stage. Up to the present the gynaecologist had been treating the disease when, judging from symptoms and signs present and the histological picture of invasion and multiplication of cells, the disease process must have been slowly gaining momentum over a period of possibly ten or twelve years.

From available statistics the results of treatment by the formidable operation of panhysterectomy or by the simpler and more effective methods of radiation therapy could now be fairly assessed on a percentage basis for the various stages of the disease.

The conclusion arising from these investigations was the fact that the chances of a successful and permanent result of either treatment were directly proportionate to

the timeliness of its application. It was logical to assume that in 100% of cases carcinoma passed through a stage when it was theoretically curable. This was the basic principle upon which depended the future control of the disease.

It had been estimated that 95% of women who develop carcinoma of the portio had had one or more children. Lacerations and cervical injuries frequently did not heal completely, and became the site of chronic inflammation, "erosion" and hypertrophy, thus upsetting the nutrition and architecture of the tissues. Another source of cervical irritation was the existence of the small mucous polypus, at the base of which carcinoma was prone to develop, possibly explaining its occurrence in the 5% of *nulliparae*. Prophylaxis involved the demonstration of these sources of irritation by inspecting the cervix through a speculum, and the application of effective treatment by cauterization or surgical repair.

In the treatment of cancer of the cervix at the advanced stage in which it was now recognized, the possibilities of surgical intervention had advanced to a stage at which better results could not be expected, and the limits of radiation therapy according to present knowledge were already in sight. To improve results better methods of diagnosis were necessary. Walter Schiller, of Vienna, from a study of a series of cervices removed for other causes had discovered that some 2.96% of them were the site of incipient carcinomata. Working on these specimens, he had given a description of the early spread of the disease before it became evident to sight or touch.

He described the early stages of assimilation, invasion and multiplication of cells, producing evidence that the spread of the cancer cells was at first laterally, after it had begun in the normal squamous epithelium of the portion near the external os. These cancer cells were distinguished from normal epithelium by an absence of glycogen, hence vital staining could be used for their detection. Lugol's watery iodine solution would stain the normal epithelium containing glycogen a deep mahogany brown, whereas it would not affect the cancer cells which remained pink or white in contrast. A scraping of the unstained area could then be taken for histological examination. This supplied an early diagnostic test for squamous-celled carcinoma.

In the case of adenocarcinoma Schiller's test did not apply. Here the examination of scrapings from any doubtful area was the only method available. Adenocarcinoma of the portio was fortunately rare. Its clinical diagnosis was to be relied on rather than its histological appearance, for in a case which came within Dr. Brown Craig's experience the pathologist failed to recognize its malignancy from a specimen sent to him. The patient had been treated in accordance with the report; when the true nature of the growth became evident further treatment was unavailing and the patient died.

Newgrowth of the supravaginal cervix might be either adenocarcinoma or of the squamous-celled variety, owing to the tendency to metaplasia of the columnar cells of the cervical endometrium.

The early diagnosis of this form of cancer was surrounded with difficulties. It was usually overlooked until it had reached an advanced stage, or it might be mistaken for fibromyoma on account of the induration of the surrounding tissues. The supravaginal cervix assumed a characteristic "barrel shape", which was best recognized by a combined rectal and vaginal palpation. To confirm the diagnosis, scrapings from the cervical endometrium were easily obtained with a sharp spoon.

Finally Dr. Brown Craig emphasized the following conclusions as a guide to the duty of the general practitioner as applied to the early diagnosis and prophylaxis of carcinoma of the cervix: (i) the importance of inspecting the cervix through a speculum in every case in which it was physically possible, (ii) the application of Schiller's iodine test as a routine in every parous woman, (iii) the necessity for effective treatment for all cases of cervical laceration when chronic infection or erosion was present, (iv) the realization of the potential malignancy of the cervical mucous polypus.

DR. RUPERT MAGAREY (Adelaide) agreed very heartily with Dr. Brown Craig's appeal for a closer inspection of the *cervix uteri* in every gynaecological examination except when it was physically impossible, for example, in a *virgo intacta*, and he thought that in this connexion the colposcope was an instrument which would, in the near future, come into general use.

In his experience, the conditions other than cancer which were most commonly missed by omitting this inspection were: (i) polypi, (ii) senile vaginitis, (iii) infection of the cervix, usually with erosion. He was doubtful whether this last condition ever led to cancer, also whether lacerations did. Schiller himself said that epithelioma always began in unbroken epithelium. He (Dr. Magarey) thought that lacerations were quite as common in well-to-do as in poorer patients, yet epithelioma was much less common in the well-to-do. Why was this? He thought there was scope for research in this undoubted fact. He had thought that contraceptive mechanisms might predispose to cancer, but their use was commoner in the wealthy, whereas cancer was less common.

He had never seen cancer in an old-standing complete prolapse, although this condition was subject to constant irritation of pads *et cetera*.

With reference to Schiller's test, he had recently been using it as a routine in his private work, and he had not yet found a case in which it had helped him. In his hospital work he had tried it in such cancer cases as were available, but he was not impressed. This was only to be expected, as these were all obvious cases, with the surface epithelium destroyed. One serious objection to Schiller's test was its uselessness in adenocarcinoma. Dr. Magarey thought that Dr. Brown Craig under-estimated the frequency of this condition.

Finally, he thought it most important that it should be recognized that Schiller's test drew attention only to unstaining patches of epithelium, and that it should be always followed by biopsy. Unless this was recognized generally he feared that the test might lead on the one hand to a dangerous sense of security, on the other to unnecessary radical surgery.

With regard to symptoms, Dr. Magarey emphasized the extreme suspicion with which an irritating and usually offensive watery discharge should always be regarded. The appearance of a slight discharge, "spotting", after coitus was also important.

With reference to treatment, he admitted his conversion, during the last five years, to radiation treatment, giving his reasons in detail. Up to five years ago he had been an ardent advocate for Wertheim's operation. He believed, however, that the ultimate solution of the treatment question would be radium plus operation plus deep X ray therapy, much after the method adopted by Schlink, of the Royal Prince Alfred Hospital, Sydney.

DR. N. McARTHUR (Melbourne) said that early diagnosis was the only thing that would alter for the better the heavy mortality associated with this condition. To achieve this, the public should be educated to report to a doctor as soon as irregular bleeding or blood-stained discharge occurred. Many women still thought that irregular haemorrhage was quite usual and to be expected at the climacteric, and so frequently reported it too late. Another factor which delayed them visiting their doctor was that psychological fear of hearing the worst, which was deeply implanted in human nature. Consequently, these patients often went to unqualified persons, who would tell them what they wished to hear. In his opinion, some legislation should be introduced to prohibit unqualified men from treating this type of patient. When examining a patient, the practitioner should always remember the "barrel-shaped" cervix described by Dr. Brown Craig, and should avoid the tendency to regard it as only fibrotic.

DR. T. G. WILSON (Adelaide) spoke of the teaching value of Dr. Brown Craig's paper, and made a plea for the greater use and knowledge of Schiller's iodine test in early diagnosis of squamous carcinoma of the cervix. With advancing knowledge and treatment, it was becoming more certain that radium was the method of choice in treatment.

in all cases of cervical carcinoma and not merely in the inoperable cases as formerly.

DR. ROLAND BEARD (Adelaide) said that he quite agreed with Dr. Brown Craig as to the value of Schiller's test, which was to the gynaecologist almost as valuable as pelvic callipers were to the obstetrician. As for the polypus of the cervix and the association with malignant disease, the fact that this was common in nulliparous patients suggested that the malignant tendency might depend upon a general cause rather than local irritation in the cervix. While the presence of chronic irritation in the cervix might be associated with possible malignant change, cervical trauma and irritation were present in almost every child-bearing woman, and yet only a small proportion developed cervical cancer. He wished to suggest that the local lesion might be exaggerated in significance. Regarding pathological reports, the cervix on the one hand was so prone to metaplasia in its epithelial structure and different pathologists held such contradictory opinions, that this often caused confusion in reports and statistics of malignant disease. He thought that he sensed in the discussion a distinct change in the attitude to treatment of so-called "pre-malignant" conditions, compared with that brought out at an Adelaide meeting about five years ago. The views expressed at the congress were important, as they went forth to general practitioners who might feel obliged to undertake too radical surgery. He quite agreed with Dr. Magarey as to the desirability of proceeding with treatment with the least possible delay after cervical biopsy. The fact that only 35% to 40% of regional glands were involved at autopsy in cervical carcinoma emphasized one aspect of the value of radium treatment. Fletcher Shaw, with his great experience of the Wertheim operation and treatment with radium alone, had now discarded operation.

DR. LLEWELLYN DAVEY (Adelaide) said that whilst he was in Vienna in 1930 he saw Lugol's Iodine solution applied to the cervix uteri on many occasions as an aid in the diagnosis of carcinoma of this part, and got the impression that whilst a negative finding was valuable, a positive result had to be interpreted with caution. In London he had found Mr. Victor Bonney and others claiming the greatest success for surgery in the treatment of cervical carcinoma; but at the Marie Curie Hospital in Paris they were totally opposed to surgery and entirely in favour of radium for this condition. He thought that sometimes cancer of the cervix was spoken of rather loosely, without due regard to the type. The Cancer Hospital in Brompton Road, London, had just received an extensive report on the attitude of workers at the Radium Institute of Paris towards this disease. It was gathered from this report that while radium was of great value in the treatment of the squamous celled type, it was contraindicated in the adeno-carcinoma of this region.

DR. F. W. BUDDEE (Sydney), speaking on cases he had seen treated at the Soho Hospital for Women, London, said that frequently the application of radium was followed by severe pelvic neuritis, the pain frequently requiring morphine. In a patient of his suffering from carcinoma of the tonsil and treated with radium, there had also developed severe pains in the scar. He made a plea for the greater development of the gynaecological pathologist in Australia, instead of placing too much reliance on the general pathologist.

DR. R. F. MATTERS (Adelaide) said that carcinoma of the cervix offered the best prospects for treatment in its early stages. Therefore, an early diagnosis was of the utmost importance; the use of Schiller's test and the colposcope both assisted in this. Cancer of the cervix was usually associated with previous lacerations. De Lee, of Chicago, recommended as a prophylactic measure immediate suture of all torn cervixes. Dr. Magarey had mentioned the rareness of cervical carcinoma in cases of prolapse of the uterus. Strachan, of Cardiff, had collected records and had found also that this was so. He thought that the extra congestion associated with prolapse maintained a better state of vitality in the cervical tissues. Dr. Magarey referred to a patient at present under treatment by him who had had complete prolapse for forty

years. Some months ago the prolapse had "cured itself", and not until haemorrhage occurred had the cancerous nature of the condition suggested itself. On examination, Dr. Matters had found the whole vagina filled with a proliferating mass. The cervical canal could not be found, so the patient had been treated by methods suggested by Heley and Ewing, of New York. Deep X radiation treatment was given, and the improvement had been so great that radium could now be used and Heyman's boxes inserted into the vagina.

PROFESSOR R. MARSHALL ALLAN (Melbourne), speaking of the great value of Schiller's test, said that its use should be more widely known. Much propaganda was needed to induce the public to report their symptoms earlier. This led to the corollary that the medical practitioner should give good attention to the patient. He had recently seen a patient past the climacteric who was being treated for a chance, whilst in reality the condition was a carcinoma. He had noticed that there was frequently too great an interval between the time when the patient consulted a doctor and the ensuing biopsy and treatment. If the patient was being induced to attend for early advice, medical practitioners had to see that the advice was sound.

DR. BROWN CRAIG, replying, said that he apologized for, perhaps, overstressing Schiller's test; he wished only to suggest it as a simple method for a general practitioner to use, and then only as part of an adequate general examination of the pelvis. It was not to be considered the whole, or even the most important thing, in diagnosis.

He did not agree with Dr. Magarey as to the slight influence of trauma as a predisposing cause, but would maintain that the inflammation persisting in a lacerated area in the cervix was a point of lowered resistance, and consequently a point of danger. When the cervix had healed and only a healthy scar was present, he did not regard this as dangerous. A watery discharge he had regarded as a very distinctive sign of carcinoma of the uterine body in the diagnosis of the conditions of women past the climacteric. He did not particularly favour the use of colposcopes, but would rather rely on having his patients in the correct position in a good light, and use the unaided senses.

Inversion of the Uterus Following Child-Birth.

DR. PERCY G. BRETT (Melbourne) read a paper on the inversion of the uterus following child-birth. He based his remarks on seven cases which had occurred at the Women's Hospital, Melbourne, during the previous five years. Three of the patients had been under his care. He had also analysed five cases reported in the *American Journal of Obstetrics and Gynecology* by D. N. Barrows, of New York, and four cases reported by G. H. Davis, also of New York, in the same journal. The cases thus numbered 16 in all.

The causes of the condition were four in number: (i) too vigorous massage of the relaxed uterus, (ii) the routine use of oxytocic drugs, (iii) traction on the cord, (iv) manual removal of an adherent placenta attached to the fundus of the uterus. In the differential diagnosis consideration had to be given to conditions causing shock, such as rupture of the uterus and *post partum* haemorrhage. The symptoms consisted of those of intense shock, which were out of all proportion to the amount of blood lost. The inverted uterus was also found in the vagina. Haemorrhage was one of the complications, but it had not been a severe symptom in the cases occurring in Melbourne. Sepsis was the main complication referred to in textbooks. No patient in the series under review had more than a mild sapromyza.

Dr. Brett showed slides on which were set out short histories of the cases that he was discussing. The youngest patient was sixteen years of age; the oldest was thirty-four years. In three cases the uterus had become replaced automatically. Of three patients who died, one died from shock and haemorrhage before any treatment had been given. Two of the patients who died had been given a general anaesthetic, and a determined attempt had been made to replace the uterus as soon as inversion had occurred. All the patients recovered whose complete

inversion had not been diagnosed until some time after inversion had occurred, and who had therefore been treated for shock only. Dr. Brett's chief reason for presenting this paper was to emphasize the point that if patients with inversion were treated for shock and haemorrhage and if the inversion was ignored, except for the adoption of antiseptic and aseptic measures, they would probably recover. The administration of a general anaesthetic and the adoption of manipulation to reduce the inversion increased the shock and the risk of sepsis, and made prognosis much worse. An inverted uterus underwent normal involution and could be replaced at any time when the patient was fit. In many instances spontaneous replacement would occur if sufficient time was allowed.

In his conclusion, Dr. Brett emphasized the statement that the treatment of shock was far more important than the making of an attempt to replace the inverted uterus. Haemorrhage and sepsis were not nearly so dangerous as shock. At least six to eight weeks should be allowed for replacement to occur after involution had taken place. If spontaneous replacement did not take place, an operation could be undertaken at any subsequent date when the patient was fit and strong. In one of Dr. Brett's cases a period of four months of waiting had not increased the difficulty of the operation. The best operation to perform was one by the abdominal route aided by pressure from below. A small incision was made through the lower uterine segment and the cervix posteriorly, if necessary, to release the constricting band. This operation was easy, devoid of shock and left very little weakness in the uterus for subsequent pregnancies.

PROFESSOR R. MARSHALL ALLAN (Melbourne) was in complete agreement with Dr. Brett, and thought that the method of dealing with these cases should be as he had suggested. He wished to point out that in the series of cases referred to by Dr. Brett the actual inversion of the uterus had not always occurred in the Women's Hospital, Melbourne, but that the patients had been admitted after this happened outside.

DR. F. BROWN CRAIG (Sydney) said he was very impressed with the results obtained by Dr. Brett and would certainly adopt measures suggested by him in any case of inversion under his care.

DR. B. E. WURM (Adelaide) referred to a case in which he was called, and was surprised to see the uterus inverted through the vulva and with the placental membranes attached. He had pulled off the membranes and placenta and had managed to reduce the inversion easily without any detriment to the patient.

DR. JOHN CHESTERMAN (Sydney) said that he noticed that in the series of cases reported by Dr. Brett the attempts at reduction of the uterus had either been undertaken immediately or else not for some weeks later. Although he fully agreed that any attempt to reduce the acute inversion when the patient was shocked was a very dangerous procedure, he asked whether there was any objection to attempting to do this after an interval of one or two days, by which time the patient would have recovered from the primary shock. Although marked sepsis had not been present in any of Dr. Brett's cases, nevertheless it was hard to see how the risk of sepsis could not be greater with the uterus perhaps extruding itself through the vulva. In any case, waiting for many weeks for spontaneous reinversion to occur meant a much longer period of hospitalization for the patient, and even after waiting, an operation might be necessary to cure the condition. A case of acute inversion of the uterus had recently come under his notice. The inverted uterus had been cleaned up and packed around with gauze soaked in acriflavine and glycerine. The following day this was removed and the uterus had been replaced without great difficulty; the patient progressed normally.

DR. ROLAND BEARD (Adelaide) said that he had not seen many cases of this condition, and in those that he had seen a complete inversion had been more common than an incomplete inversion. In no circumstances did he agree that attempts at reinversion should be made early whether shock was present or not. He agreed with

Dr. Brett in waiting for spontaneous reinversion to occur. He had also wondered why sepsis was not more frequent in this condition, and thought perhaps that the tight ring of the cervix gripping the inverted organ might, by pressure on the lymphatics and blood vessels, prevent the spread of organisms by these channels.

DR. J. GREEN (Melbourne) asked Dr. Brett whether he thought any harm would occur from making one gentle attempt to replace an acute inversion. It might be successful, and, if it did no harm, would simplify further treatment.

DR. E. BRETTINGHAM MOORE (Hobart) referred to two cases that he had seen. In one of these inversion of the uterus had been treated with a form of rubber stem pessary by which continuous gentle pressure was exerted on the inverted fundus; when reinversion had occurred this was removed. In the second case in which he was called in he found the patient almost moribund and the uterus inverted. An attempt at replacement failed. As bleeding was occurring, he had reduced the inversion by cutting through the tight ring of the cervix that was gripping the inverted uterus, had replaced it easily and then resutured the incision.

DR. N. McARTHUR (Melbourne) said that he was so impressed by Dr. Brett's results that he considered his method of treatment the correct one. Some years previously he had been attached to the staff of the Women's Hospital, Melbourne, for a period of seven years as an obstetrician, and during this period he had not seen any case of inversion of the uterus. He thought that perhaps this was just as well, as the treatment advocated in those days was excision of the uterus. He wondered why during this time no cases had occurred in the hospital, whereas Dr. Brett had seen his series of cases in four and a half years. He could offer no reasons as to its aetiology. Was it due to violent premature efforts at expulsion of the placenta or perhaps some sudden relaxation of the cervical ring or uterine musculature?

In reply, Dr. Brett said that he quite agreed that immediate attempts at reinversion of the uterus might succeed. They were by no means doomed to failure, but results of this method would be bad.

In answer to Dr. Chesterman, he said he had himself wondered why the uterus should not be replaced on the second or third day, but actually at that time it was very swollen and oedematous and consequently would be difficult to replace. Firm pressure might cause trauma and this would lead to an increased risk of sepsis.

Relying to Dr. Green's question, he said that in some cases in which the inversion was not complete, replacement might be easy, and a gentle attempt at reduction might succeed without harm.

Concerning the aetiology of this condition, it had been suggested that an over-use of pituitrin and ergot in labour might play a part. He also thought that too much handling and pressure with the fundus in the third stage of labour was a factor.

Ether Analgesia and Anaesthesia in Midwifery.

DR. T. H. SMALL (Sydney) read a paper on ether analgesia and anaesthesia in midwifery. He said that, like most general practitioners, he had tried many drugs for the relief of labour pains, and had not been entirely satisfied with any.

After trying on himself gas-oxygen, gas-air, chloroform, and kelene, he used ether with Clover's inhaler to produce analgesia. It was successful, but Clover's apparatus was not suitable for midwifery.

Bourne and Burns, and also Buschbeck, had recommended ether for obstetric anaesthesia, and ether had displaced all anaesthetics at the Wurzburg Clinic in Germany. These authors found that ether caused no harm to mother, child or the progress of labour. Miss K. Lloyd Williams advocated ether as being safe and suitable for practically all cases, but said that analgesia was slow in onset and generally coincided with the first stage of anaesthesia. Dr. Small had found that ether analgesia was a very definite stage preceding loss of consciousness.

In a series of two hundred cases at the Royal Hospital for Women, Paddington, results from ether had been good. The apparatus could produce analgesia as well as anaesthesia for the application of forceps, perineorrhaphy *et cetera*. The apparatus used one and a half ounces of ether per hour, and the ether could be self-administered. Analgesia was obtained if one-sixteenth to one-eighth of the inspired air passed over the ether vaporizer. The odour of ether was masked by inhaling the vapour through suitable perfume.

Gases from the outlet valve collected over water in a jar did not take fire until the ratio of etherized air reached one-half. Dilution in the atmosphere of a well ventilated room made this apparatus safe, but care was advisable with higher ratios in the presence of naked flame. Valves opening only with inhalation and then closing automatically prevented exposure and escape of ether.

The results in 200 cases were as follows. There were 98 *multiparae*, 102 *primiparae*. Thirty-one patients had pathological states; two were preeclamptics; 22 had albuminuria, the amount varying from a "cloud" to "half"; two had influenza, and there were five others. None were adversely affected. The duration of labour averaged eleven and a half hours, including all three stages. The duration of analgesia varied from seventeen hours to five minutes, the average being 2-3 hours.

The progress of labour was normal in 184 cases, and delayed in 16; of the patients 14 were *primiparae* and two *multiparae*. In 10 cases forceps were used; there were three persistent occipito-posterior presentations, four patients had narrow outlets, one patient had inertia, one child was post-mature, and in one case maternal distress was present. Six patients were overdosed with ether; forceps were used in none of these six.

The ill-effects in the mothers were as follows: slight vomiting occurred in 17 cases, excitement occurred in six cases, three patients were uncontrollable, two were noisy, four had nausea, one had headache. Ill-effects in the child were not due to ether.

Dr. Small enumerated the complications of labour. He said that primary inertia occurred in one case and pro-lapse of the cord occurred in one case in the first stage. In the second stage perineal laceration occurred in 34 cases, episiotomy was undertaken in four cases, and delay necessitating application of forceps occurred in ten cases. In the third stage the placenta was retained in one case, *post partum* eclampsia occurred in one, and *post partum* haemorrhage in eleven cases, three being severe and eight only moderate, this in 200 cases.

Ether had been administered by the patient herself for analgesia in 186 cases, in 24 the anaesthetic had been entirely self-administered throughout.

Anaesthesia for birth of the head, for the application of forceps, for perineorrhaphy, for manual removal of the placenta had been induced with this apparatus 166 times.

Dr. Small said that as far as relief from pain was concerned, six patients had no relief, 42 had moderate relief, 137 had considerable relief, and 15 total relief.

The amount of ether used averaged 3-6 ounces in 2-3 hours. The rate for application of forceps was 6%.

Referring to the percentage of ether vapour used for anaesthesia, Dr. Small said that Dr. J. E. Mills, of the University of Sydney, had kindly examined the mixture inhaled at a ratio of one-eighth, and found the percentage by volume to be 3% approximately.

Dr. Small's general conclusion was that ether should be used for all purposes in midwifery in preference to chloroform.

PROFESSOR R. MARSHALL ALLAN (Melbourne) said that the machine described by Dr. Small had been used in the labour wards of the Women's Hospital, Melbourne, in 75 deliveries. Administration had been by sisters and nurses. They had at first found some difficulty in getting patients to take the initial number of breaths to produce an effect, but when they had done this they all said that good relief from labour pains was obtained. In one case a patient had coughed to such an extent that administration was stopped. Another refused to use the instrument. The average time of administration was from one and a half to two hours; the shortest period being a quarter of an hour, and the longest three to four hours. The average

amount of ether used had been about three ounces, and the maximum about six ounces. A full anaesthesia had been attempted in one case, but had not succeeded. In another case full anaesthesia had been obtained by using the machine to its maximum capacity. In every case the patient, on becoming accustomed to its use, had wanted to keep on with the machine. The nursing staff had all been enthusiastic and convinced of its value, but they considered that some supervision of the patient was necessary throughout, particularly in a large labour ward. Concerning the results, he would say that of the 75 cases four had been unsuccessful and the others eminently successful.

Professor Marshall Allen considered that the greatest difficulty was in training the patients to take the requisite number of breaths at the commencement of administration. He thought that the apparatus was of great value, and intended to continue with its use.

DR. H. M. FISHER (Adelaide) gave the meeting a summary of the results obtained with Dr. Small's machine in the Queen's Home, Adelaide. It had been used for forty patients, 18 of whom were *primiparae* and 22 *multiparae*. As a rule results were very good, and the apparatus was very much appreciated by the patients. The ether appeared rather to help than hinder the patients, especially in the second stage, and with few exceptions there had been no delay in labour. In two instances in which delay occurred an over-concentration of ether had been administered. Both of these patients delivered themselves quite rapidly when ether was withdrawn. The average amount of ether used in each case was just under one ounce per hour, and the duration of administration varied from three-quarters of an hour in the shortest case to twelve and three-quarters in the longest. Administration was usually commenced as soon as the patient was having pains every five minutes, and when the os on rectal examination was found to be "three fingers dilated". There were no severe ill-effects to the patient or the infant, but in three cases vomiting occurred, which might easily have been a normal phenomenon of the beginning of the second stage of labour. The best results had been obtained by using an ether concentration of one-sixteenth in the first stage. This usually relieved, but did not remove the pains. In the second stage a concentration of one-eighth sufficed for most patients until delivery of the head, when the concentration was increased to one-quarter or one-half. Full anaesthesia had been induced in a few instances for forceps delivery or for suturing the perineum. Many of the *multiparae* had remarked that their labour was the easiest they had had.

DR. S. V. MARSHALL (Sydney) stated that he had had experience with the machine and considered it to be as close to fool-proof as it was possible to make an anaesthetic machine, and consequently was very suitable for general use. He thought that possibly prolonged administration of ether might have some toxic effect. It might cause a post-anæsthetic acidosis and depletion of glycogen reserves in the liver. He recommended caution in using it in respiratory diseases, particularly in pulmonary tuberculosis. As had been pointed out, there was considerable danger in giving chloroform to a patient suffering from anoxæmia, such as might occur in the use of Minnitt's gas-air apparatus. He referred to the economical advantage of ether over other anaesthetics. He had suggested to Dr. Small that by using a combination of vinyl ether plus ether in the machine the irritant effects of ether might be diminished.

DR. H. HUNTER (Sydney) considered that this machine filled a much-needed requirement. He was much impressed by its simplicity. The administration of nitrous-oxide and oxygen required a trained anaesthetist, if it was to be continued for long or for producing deep anaesthesia. He also wished to stress the danger of administering chloroform after gas and ether on account of anoxæmia which might be present. This was particularly so in anæmic patients in whom sub-oxygenation of the blood might not easily be recognized. If chloroform was given to these patients a very severe relapse might result. Dr. Small's machine was very safe. Its effect in toxæmias of pregnancy was yet to be observed, but he did not think that

ether in such small quantities would be likely to produce much damage.

Dr. Small, in reply, said that in most of the cases referred to by him, administration had been in charge of a staff nurse. He had found that the same degree of analgesia could be produced and maintained by dropping very small quantities of ether on an open ether mask, but the probable disadvantage of that method in labour meant standing by continuously for a long period of time.

Endometrioma.

DR. BRUCE MAYES (Brisbane) sent a paper on endometrioma which was read by Professor R. Marshall Allan. Dr. Mayes stated that endometrioma had been established as an entity in 1921 by the work of J. A. Sampson. An endometrioma was really misplaced endometrial tissue, identical in its histological structure with the uterine mucosa and governed physiologically by the same laws as controlled the uterine mucosa. Endometrioma might occur in the pelvic peritoneum, in the ovaries, in the rectovaginal septum, in the uterine ligaments, in the umbilicus and abdominal wall, in the inguinal region, in the perineum and in the intestine.

Its origin in most cases was by actual invasion of the uterine and tubal wall by the Müllerian mucosa or by actual transference of endometrial cells via the Fallopian tubes to its ultimate site.

Other theories were: (i) The Wolffian theory (von Recklinghausen), according to which the condition was due to remains of the Wolffian tubules; (ii) the Müllerian theory (Cullen) according to which it was due to Müllerian "rests"; (iii) the serosal theory (Meyer) according to which it was due to a heterotopy of peritoneal cells; (iv) the lymphatic theory (Halban), according to which it was due to a metaplasia of cells lining the lymph spaces.

In its most common site, the ovary, an endometrioma usually occurred in the form of a "chocolate cyst" and eventually led to involvement by adhesion of most of the other pelvic organs. The endometrioma was not malignant but closely simulated a carcinoma in its mode of invasion of adjacent organs.

Describing the clinical features, Dr. Mayes stated that an endometrioma occurred during the period of active menstrual function, most frequently between thirty years and the menopause. Complete sterility of several years' duration was common. The chief symptoms were acquired dysmenorrhoea in a middle-aged woman, pain and constipation, which was worse at menstruation. There was as a rule no uniform alteration in the menstrual function.

Probably the most characteristic physical signs were a retroverted uterus and the presence of shotty nodules in the pouch of Douglas.

The endocrine element was evidenced by changes in the tumour occurring during menstruation, pregnancy and the menopause. They were a periodic swelling and blood-stained discharge when the tumour occurred in external sites (menstruation), a decidua reaction in the stroma (pregnancy), and an atrophy of the glandular structure (menopause).

Historically the tumour was of particular interest, as the name "endometrioma" had been given to it by a Foundation Fellow of the British College of Obstetricians and Gynaecologists, the late Blair Bell.

DR. F. BROWN CRAIG (Sydney) spoke on the difficulties in the diagnosis of endometrioma unless they came near to the surface and showed a bluish coloration and cystic swelling. He did not think that they could be distinguished clinically from old-standing pelvic inflammatory diseases. He referred to an unusual case in which the patient had had hysterotomy performed in South Africa for the purpose of removing an unwanted pregnancy. The uterine cavity had been curetted through the uterine incision. The patient had later consulted him complaining of pain and frequency of micturition and haematuria. The urologist had considered that a carcinoma was present in the bladder wall. At operation there were found dense adhesions around the side of the previous operation scar binding the uterus and upper wall of the bladder to the abdominal wall. With difficulty portion of the bladder wall had been excised. Histological examination revealed an endometrioma to be

the cause. He had not been able to follow up the subsequent history of this patient, but it presented many points of interest in regard to aetiology. He had not seen many endometriomas in practice and those that he had seen might have been removed without great difficulty and with good results.

DR. ROLAND BEARD (Adelaide) pointed out that Dr. Bruce Mayes in his paper had not been in favour of radiation treatment for endometrioma. Dr. Beard considered that deep X ray therapy might be useful, and he had used radiation as supplementary to surgical treatment. In one case that he had seen, the condition had apparently followed the operation of Cæsarean section.

DR. B. E. WURM (Adelaide), referring to methods of treatment, asked whether the ovaries should be removed at operation, thus preventing any further activity of endometrial cells wherever placed.

DR. RUPERT MAGAREY (Adelaide) referred to Victor Bonney's conservatism. He had watched his work for some time and noticed that he would never remove an ovary at operation, or, in fact any more than the actual lesion itself. Dr. Magarey himself had adopted this policy. He considered radiotherapy to be a useful adjunct. It had occurred to him that during a tubal insufflation or even simple dilatation of the cervix, endometrial cells could be pushed out along the tubes and sometime or other produce an endometrioma. He mentioned that endometrioma might simulate a ring carcinoma of the bowel, and referred to an instance in which a patient had had a laparotomy performed and the abdomen had been closed because what later proved to be an endometrioma on the bowel wall had looked to the surgeon like an inoperable carcinoma.

Professor Marshall Allan during his reply said he was surprised that Dr. Mayes in his paper had made no reference to the theory that King, of Melbourne, had put forward to explain this very interesting condition.

Indications for Interference During Labour.

DR. ARTHUR M. WILSON (Melbourne) forwarded a paper on indications for interference during labour. The paper was read by Professor R. Marshall Allan. Dr. Wilson confined his discussion to those cases in which the indication for interference had resulted from a breakdown of the obstetrical mechanics and machinery in the delivery of a fetus presenting by the cranial vault. He stated that the successful termination of any delivery was dependent on the following factors: the relationship of the size of the fetal presenting part to the size of the maternal pelvis, the presentation, the position, the time at which the membranes ruptured, the mouldability of the fetal skull, the dilatability of the maternal soft parts, the strength of the uterine pains. Any one of these factors might be unfavourable and with varying degrees of intensity. With all the possible permutations and combinations of these factors it was obvious that the possible happenings in any labour were unlimited.

In discussing the appearance of the abnormal in the first stage of labour, Dr. Wilson likened a labour to a mile race in which some of the competitors dashed away at the start and soon became exhausted and others crawled the whole distance and arrived at the post in excellent condition. He referred to the folly of attempting to deliver the patient before she was ready. He stated that the most important factor in the causation of inefficient pains was fear engendered by friends and acquaintances and sometimes unfortunately by the obstetrician. Every primigravida really underwent a trial labour, and it was most important that the obstetrician should be able to tell whether the labour was proceeding satisfactorily or not. As long as the membranes were intact labour might be allowed to go on. Many authorities maintained that labour might be allowed to go on indefinitely when the membranes were intact, but Dr. Wilson held that when the cervix was fully or almost fully dilated the membranes should be artificially punctured. No trial labour was complete unless the patient had four hours of labour after the rupture of the membranes. Rupture of the membranes at the onset or early in the first stage was one of the

most unfortunate complications and was often associated with some other unfavourable factor. No matter what unfavourable factors were combined, the obstetrician had no option but to wait patiently as long as labour was advancing before he undertook any interference.

The signs of obstructed labour might be maternal or foetal. These would be discovered by abdominal palpation and by pelvic palpation, which would reveal non-descent of the head and a failure of the cervix to dilate. Signs of foetal distress were a heart rate of below 120 or over 160 in between the pains with irregularity of the heart beat and the passage of meconium. The indications for interference during the first stage were an obstructed labour, a slow labour and foetal distress. The justification for interference in a slow labour was debatable. The commonest causes of slow labour were a slight disproportion, premature rupture of the membranes, a posterior position of the foetus, poor dilatability of the maternal soft parts. In the first and second of these conditions no interference was indicated provided labour was advancing. With the posterior position most of the forward rotation occurred during the second stage of labour. As a rule non-dilatability of the maternal parts was merely a sign of other unfavourable factors. Dr. Wilson issued a warning against manual dilatation of the cervix when it was less than half dilated and against an attempt to deliver the head when it was high.

Indications for interference during the second stage of labour were maternal distress, foetal distress and delay in the second stage. Delay was important only because the case resolved itself into one of foetal or maternal distress. The commonest cause of delay in the second stage was a posterior position of the foetus in which forward rotation of the occiput was delayed. After discussing the forward rotation of the occiput, Dr. Wilson referred to the forceps operation, which he classified into four groups: high forceps operation, the mid-forceps application, the low forceps application, and the head on the perineum operation. It should be the aim of the obstetrician to allow all his patients to reach the low forceps stage before interference was undertaken; and even then it was hardly justifiable if the patient could do more for herself. Dr. Wilson stated that he applied forceps in about 75% of his cases and that of these 90% were of the "head on the perineum variety". He thought that this was justifiable because anaesthesia weakened the pains and the obstetrician had to complete delivery either by the application of forceps or the injection of pituitary extract, both manoeuvres being frequently combined with an episiotomy.

In discussing interference during the third stage of labour, Dr. Wilson stated that haemorrhage was still the third most common cause of death in child-birth. The commonest cause of *post partum* haemorrhage was mismanagement of the third stage of labour. It was astonishing how many obstetricians were prepared to wait two to three hours for the arrival of the baby, but were not prepared to wait two to three minutes for the arrival of the placenta. The natural contractions of the uterus would expel the placenta much more satisfactorily than any effort of the practitioner. *Post partum* haemorrhages were almost invariably of the atonic variety and here treatment was indicated. The partial separation of the placenta should be completed before the patient became exhausted and exsanguinated. A manual removal of the placenta while the patient still had a good colour and a pulse rate of under 100 was not very dangerous, but the risk of removal in an exsanguinated patient whose pulse was between 140 and 160 was appalling. The obstetrician should therefore make up his mind very early. In conclusion, Dr. Wilson stated that patients with *post partum* haemorrhage should be treated according to the ordinary rules of surgery.

DR. R. BEARD (Adelaide) said that premature interference still held the first place in obstetric regrets. The art of midwifery lay in correct decisions. In Australia one of the most serious single factors in delayed labours was inefficiency of the forces, of which city life was an

important cause. Pronounced inertia was less common in country women. Uterine efficiency was tremendously influenced by emotion, and the use of sedatives or anaesthetics presented a problem. He agreed with Dr. Wilson as to the management of these cases, and thought that the endurance of the mother was greater than that of the foetus. He thought that the diagnosis of the onset of labour given by Dr. Wilson and his advice to the relatives of the patient were good, but considered that the older *primigravidae* needed obstetric aids at their labours, for when such patients presented abnormalities the prognosis was worse than that of a young woman.

DR. BEARD thought that Dr. Wilson's treatment, whether the membranes were intact or ruptured, was very sound. With obstructed labour it was important to work on a preconceived obstetrical prognosis. He agreed with the views expressed on interference during the first stage of labour. With regard to interference during the second stage of labour, he said that while funnel pelvis was rare, he had seen some cases. He then referred to a monograph entitled "The Occipito-Posterior Position" and written by himself, in which he expressed views which differed from those given by other writers on the same subject of rotation of foetuses in the posterior position. He believed that there were three and not two vertex positions, each of which showed distinct characteristics. These were occipito-anterior, or short rotator; intermediate posterior, or long rotator; sincipito-anterior, or short rotator. In the first two the denominator—the occiput—was on the rotating part of the pelvic floor. In the third position the sinciput was the denominator, and the occiput was off the rotating part of the floor. All depended on floor contact. The primary position of the sagittal suture at the inlet determined the mechanism. His theory postulated primary importance in the cephalic position. The foetal attitude was of secondary importance. He thought that deep transverse arrest was partly explained by the fact that the presenting part was behind the rotating floor. Dr. Beard considered that these positions were usually easily diagnosed clinically and suggested that the plan explained many of the most confusing features of mechanical behaviour. It helped in diagnosis, prognosis and management, and gave one a ground-floor plan of mechanical behaviour in labour. The sincipito-anterior position was relatively uncommon and was found in only 3% of vertex cases. He thought that students would be helped by this classification. He agreed with Dr. Wilson's opinion of the forceps operation. Even the mid-forceps operation was serious.

In conclusion, Dr. Beard said that Dr. Wilson's advice concerning the third stage was excellent. It was advisable to put the patient in the dorsal position early after the baby was born. He thought that the remarks on manual removal and obstetric shock were most apt.

DR. M. F. WILLIAMS (Western Australia) said that he had gathered from reading that the modern tendency was to avoid pituitrin altogether until after the third stage of labour, and wished to hear the opinion of members in regard to its use.

DR. M. DE GARIS (Geelong) considered that delay in labour was most serious during the first stage, as she thought that present-day methods of dealing with this by sedatives and patience were sometimes responsible for the loss of the baby's life, which meant a failure in treatment. She had noticed in her practice that when there was delay in the first stage there was also frequently haemorrhage in the third stage of labour. Her method of treating prolonged first stage was to give the patient an anaesthetic and then artificially dilate the cervix with her fingers. She would then wait for further progress. She stressed the point that knowledge of muscle action in labour was very insufficient, and that much more study should be devoted to this subject.

DR. T. G. WILSON (Adelaide) said that one of the difficulties encountered, particularly by the young general practitioner when confronted with prolonged labour, was the attitude of the patient's relatives, who frequently urged him to do something against his better judgement.

He did not quite agree with Dr. Wilson's statement that narrowing of the bony pelvis was an extreme rarity.

Referring to Dr. Beard's remarks, he was favourably impressed with Dr. Beard's explanation of the mechanism in occipito-posterior presentation, and thought that his theory explaining a short anterior rotation of the sinciput to the front a valuable one. Nevertheless, he thought that a long rotation of the occiput through three-eighths of a circle to the front, as explained by the usual teaching, did occur.

DR. B. E. WURM (Adelaide) said that much could be done to prevent delay in the first stage of labour due to faulty pains, by the removal of fear from the patient's mind as part of antenatal advice. Dr. Wilson had said that no labour could be regarded as a trial labour until four hours had elapsed after the rupture of the membrane. He considered this time too long, and quoted F. J. Browne in his recent book on "Antenatal and Postnatal Care", in which he defined trial labour as one in which regular pains had occurred for two hours after rupture of the membrane. He thought that the difficulties associated with post-maturity should be prevented by induction of labour soon after the expected date of confinement.

In the treatment of occipito-posterior positions the teaching at the Rotunda Hospital was to apply forceps and to rotate the head with these rather than by manual rotation. When dealing with a delayed atonic type of labour he advocated the administration of pituitrin as soon as the child had been delivered to prevent a possible hemorrhage during the third stage.

DR. E. BRETTINGHAM MOOSE (Hobart) said that, fortunately, contracted pelvis was rare in Australia. He had found the persistent occipito-posterior to be the commonest type of abnormality met with in practice. In its treatment he considered manual rotation of the head to be much superior to rotation with forceps, and he had not yet met with a case in which this could not be done. He would strongly condemn the delivery of the head in the persistent occipito-posterior position. It was his practice in the majority of cases to save his patients some of the second stage of labour by delivery with forceps when the head was on the perineum. He used pituitrin at this stage of labour also, and thought that it helped to shorten labour and to avoid the use of forceps in some instances. He would like to stress the value of exercises to the patient during pregnancy, and he also thought that by removing fear of labour delay from inadequate uterine powers could be largely avoided.

DR. P. T. S. CHERRY (Adelaide) said that he thought that one of the factors causing the patient to feel nervous was over-enthusiastic antenatal care, by which the patient was apt to regard labour as a pathological process, which it was not. He had found that in industrial centres where, owing to lack of time and for other reasons, antenatal care was not so likely to be over-stressed, women approached labour with less apprehension.

With regard to treatment of occipito-posterior positions, he would quote the adage of Fothergill: "The more you know, the less you do." Rotation of the fetal head could always be achieved provided it was done at the right time. He strongly deprecated the growing tendency to use Cesarean section as a means of avoiding the problems of prolonged labour. Its effects could always be controlled with chloroform. In its action it imitated Nature and supplied *vis à tergo*. He had not seen retention of the placenta caused by the use of pituitrin.

DR. RUPERT MAGAREY (Adelaide) asked Dr. De Garis by what method she dilated the cervix in the first stage of labour. In his opinion the less interference there was at this stage, the better. He agreed with Dr. Wurm that post-maturity should be avoided by medicinal induction of labour, if gestation continued for more than a week beyond term. He thought that time was well spent in explaining to patients the processes of labour beforehand; he had found that if they knew something of what to expect, they remained more calm throughout their labours. He did not approve of rotation of occipito-posteriorly placed fetuses by forceps, but he always used his hand; nor did he approve of the use of pituitrin before the end of the first stage of labour.

DR. G. A. THOMPSON (Perth) thought that manual rotation of the head could always be achieved. He had great respect for the obstetric teaching at the Rotunda Hospital in Dublin, but regarded their method of rotating the head with forceps as one of their bad points. He thought that severe degrees of contraction of the pelvic outlet were rare, and had never had any trouble from this abnormality. He condemned the use of pituitrin in the second stage of labour, considering that it might be dangerous to the infant from pressure; also he had seen rupture of the uterus occur in two cases following its use. He had found pressure on the fundus of value in assisting delivery of the head when there was delay on the perineum. He would advise all obstetricians to make an examination of the vaginal walls after delivery by forceps as a routine method. The extent of lacerations there would prove to be considerably more than expected.

Professor Marshall Allan, in reply, said he was in general agreement with what Dr. Wilson had said in his paper. Regarding pituitrin in teaching students, he did not advocate its use during labour. It certainly should not be given to a *primipara*, and care should be taken that no obstruction to the advancing head was present. He did not regard a contracted pelvic outlet as a common condition, but thought that it was often put forward as an excuse for a dead infant. In treating a persistent occipito-posterior position he would avoid all attempts at artificial dilatation of the cervix, but would wait until full dilatation had occurred and then manually rotate the fetal head, which could usually be done without much difficulty.

The Methods of Induction of Labour.

DR. JOHN GREEN (Melbourne) discussed the methods of induction of labour. He pointed out that there was a slight element of unreliability which made induction one of the annoying procedures of midwifery. History confirmed mistrust and did not help in the choice of a method.

In dealing with general considerations, Dr. Green said that the intrinsic value of any method depended on promptness, safety and a way of escape. Slow response might defeat the object of the obstetrician; and when surgical methods were used, might allow infection to occur. There might be aggravation of the mother's condition when toxæmia was present, especially after anaesthesia. Quinine might perhaps poison the child, the tube might set up placental infection, and rupture of the membranes intrapartum pneumonia. If labour lagged, the situation might be compromised, and a way of escape was important. Dr. Green asked four questions.

The first question was: "How long may the labour lag without risk?" His reply was that if labour did not commence on the third day, surgical induction was becoming a menace and not a help.

Of the methods employed, a medicinal stimulation was useful when the obstetrician was not very insistent on success. Surgical induction, chiefly by the use of rectal tubes and artificial rupture of the membranes, was preferred in the Women's Hospital, Melbourne, when a definite result was required. Associated with 24,360 deliveries in seven years, there had been, roughly, 2,500 medicinal and 500 surgical inductions, the use of the tube predominating. They had not been impressed by other methods.

Dr. Green's second question was: "Does quinine kill the baby?" He replied that possibly in 1% of cases it did, but the risk was worth while. In regard to which was the best surgical method, Dr. Green pointed out that the use of the rectal tube and rupture of the membranes were both very useful. Rupture of the membranes was better when the response was prompt, but was embarrassing with delay. They tended to prefer the tube. Medicinal stimulation might be usefully combined with surgical induction, but multiplication of vaginal manipulation was unwise. Failure was of little moment in medicinal stimulation. Surgical induction, although highly successful, might cause concern in perhaps 5% of cases and disappointment in many more. He had no wish to emphasize this aspect, but criticism was unavoidable in the discussion of induction as a fundamentally preventive procedure.

Dr. Green's third question was: "What if there is a delayed response to surgical induction?" His reply was that there were various factors, but if labour could not be provoked on the third day, the tube might be removed. Very rarely deterioration of the patient's condition suggested Caesarean section.

Dr. Green went on to say that a method could not be assessed merely in relation to simple "experimental" cases, but it should be adequate to the abnormal conditions present when induction was seriously indicated. This should be thought of when results were compared. More than 75% of the patients submitted to induction were toxæmic and nearly one-third were under thirty-six weeks pregnant.

Dr. Green's fourth question was: "What method is best in the presence of disproportion?" He said that they used the half-hearted medicinal stimulation. In the treatment of *primiparae* they avoided surgical induction because of uncertainty, and they used the tube for *multiparae*. The toxæmic *primipara* who was barely viable presented the greatest difficulty in induction. They tended to use tubes with *primiparae* and to rupture the membranes in *multiparae*. It was difficult to say which method was the best for use with a dead fetus. Repeated stimulation was always safe, but tubal induction might become necessary. In Melbourne they had not been impressed by the injection of oestrogenic substances.

Dr. Green's general conclusion was that medicinal stimulation was safe but uncertain, and that surgical induction was reliable but occasionally disconcerting. It remained to be proved that other methods were safe, and obstetricians were still hoping to discover a safe, simple and reliable method, which, incidentally, would revolutionize obstetrics.

Dr. E. BRETTINGHAM MOORE (Hobart) said that induction of labour had been introduced originally to cope with the difficulties of disproportion; its sphere of usefulness in this direction had been more and more restricted, and Dr. Brettingham Moore thought rightly so. He would indeed go so far as to say that in a *primipara* it was nearly always preferable to wait till term and to watch the result of what Fitzgibbon termed a "trial labour".

It had to be admitted by those who would criticize this attitude that it was only in the border-line cases that induction was considered; and it was surely the experience of every one of those present that the vast majority of these apparently border-line cases were not border-line at all, but that the patients came triumphantly and often easily through their labour. Many fetuses which on palpation towards the thirty-sixth and thirty-eighth weeks showed no sign of engaging, did so as soon as the pains began. For the few who would not be delivered, the time was optimum for a low cervical Caesarean section, and the maternal mortality rate was practically nil.

On the other hand, as Dr. Green had pointed out, the risks to the mother in induction were by no means negligible. Dr. Green was less positive in his attitude with regard to the infant mortality due to induction, but had quoted some very suggestive figures.

Dr. Brettingham Moore had no hesitation in giving it as his personal experience that a small but definite proportion of babies died even when only quinine had been used. What, then, were the indications for induction in cases of disproportion? Dr. Brettingham Moore's own feeling was that induction in a *primipara* was best done at or near term, when but very little was needed to start the obstetric ball rolling.

In a *multipara*, if there was a history of prolonged or difficult labour, induction might be commenced in the thirty-sixth to thirty-eighth week, not before. Dr. Brettingham Moore said "commenced" advisedly, for the process often ran into several days or a week if medical induction was repeated before surgical induction was undertaken.

It was his practice never to attempt surgical induction until medical induction had been tried, as the uterus was thus sensitized and a long delay was never encountered. As the previous speaker had pointed out, and as was borne out by the experience of others, it was this delay

that added so much to the risk. In a very thoughtful paper by Penfold and Butler, of the Baker Institute, it was shown that the morbidity to both mother and child was much increased when the time of induction exceeded thirty hours.

Dr. Brettingham Moore then discussed methods. He thought that the so-called London method—of castor oil, a hot bath, a tight binder, an enema and three cachets of quinine sulphate at two-hour intervals—was so stereotyped as to need no repetition. He would mention, in passing, that he had reduced the quinine cachets to seven and a half grains, and that he gave pituitrin only if there were a few pains. If surgical induction was necessary, it was done on the third day, except in toxæmic cases, when there was a degree of urgency.

Dr. Brettingham Moore then referred to the "tube" method. He said that a stomach or medium sized rectal tube was cut to fourteen inches or fifteen inches and a foot or so of tape was tied near the cut end. This facilitated its removal, which was done at the onset of pains, and never later than twenty-four hours from its insertion. The tube was laid between the cervix and the membranes, which were separated from the lower uterine segment by the finger for that purpose, and, lying wholly within the os, needed no packing.

The other method, which he preferred, was carried out with the aid of a large bore silver male catheter, bent to an "S" shape, and the tip was brought to a blunt square point. As before the membranes were separated, in this case to a higher level posteriorly, and then punctured high up with the catheter. A pint or more of *liquor amni* was run off, and the catheter was withdrawn. This method was technically a little more difficult, but obviated the presence of a foreign body and preserved the bag of forewaters intact—surely an ideal worth striving for. In Dr. Brettingham Moore's experience it was as prompt and efficacious as the tube method, and in a toxæmic patient appeared to afford relief of the preeclamptic symptoms, probably by reduction of intraabdominal pressure.

Dr. G. ASHBURTON THOMPSON (Perth) said that Dr. Green had attacked this problem of induction of labour in such a spirit as to evoke open-minded constructive replies. Dr. Thompson proposed to put before the meeting the results of his own experience. First of all he referred to quinine. He doubted its efficacy as an induction agent, but believed that it was a uterine sensitizer and found its administration useful as a preliminary or coincidental aid to other methods. If the presence of meconium in the liquor was really an indication of fetal distress, the drug was undoubtedly toxic, for Dr. Thompson had seldom seen uncontaminated liquor in patients who had had thirty grains or more in divided doses given over twelve hours. But at the same time he had never been able to satisfy himself that it had caused fetal death and therefore he continued to use it as an adjuvant.

Regarding combination of methods, Dr. Thompson, in common with other observers, preferred to keep the membranes intact if possible for the sake of the fetus; but experience had shown that the use of bougies or of the rectal tube often involved delay in the onset of labour with detrimental results to both mother and baby in cases of urgency. It was partly on account of the unreliability of this method and partly on account of the obvious danger attendant on repeated manipulation that he had discarded it several years previously. The question then arose as to what was the best method of induction which still allowed preservation of the amniotic sac. The answer was that his own preference was packing of the lower part of the uterus and cervical canal with gauze. In order that this might be done with a minimum of risk of infection and in the shortest time and without an assistant, he used the packing tube shortly to be described. But packing the lower part of the uterus occasionally failed (but not often). If it was successful, the onset of pains was seldom delayed more than twelve hours and the gauze could then be removed. If it failed, one could still fall back on drainage of the amniotic sac (the most dependable of all methods after the twenty-fourth week), the uterus now being more responsive because the fore-

going stimulation had produced both dilatation and softening of the cervix. If pregnancy was advanced less than twenty-four weeks, packing seemed to be more dependable than draining of the sac, except in cases of overdistension.

Dr. Thompson said that he used this method for induction for vesicular mole, post-maturity, elderly primiparity associated with a massive leathery cervix, and for pregnancy of less than six lunar months' duration. As he seldom induced labour for disproportion, he could not express a good opinion, but he thought he would favour the same method if pressed, his views in this connexion being that of the two necessary evils, induction by packing and induction by bougies, the former was the lesser evil. It seemed to him that from the point of view of infection it was safer to pack the lower part of the uterus with sterile antiseptic gauze than to introduce foreign bodies into it. Also the former method was more certain and more rapid. But these advantages had to be balanced against the dangers of causing displacement of the head with possible prolapse of the cord and malpresentation.

Apropos of induction with bougies Dr. Thompson had been most interested when he was at the Rotunda Hospital last year to find that the present Master had no hesitation whatever in performing lower segment Cæsarean section on patients in whom labour had been induced in this manner even after quite long trials of labour. Dr. Thompson would be glad of further information, however, on the comparative values of the two methods.

Reliability seemed to be the most urgent requirement when dealing with the toxæmias, and for this reason he almost always drained the amniotic sac, using preliminary or coincidental quinine medication as well. He had been able to satisfy himself in the past that rapidity of onset of pains bore a definite relationship to the amount of liquor drawn off and that was why he used the term "drainage of the amniotic sac" in preference to the usual term "A.R.M."

With the object of achieving rapid onset by drainage of the sac, they used in Perth the uterine catheter which he would show. Reviewing cases of labour induced by this method during the past three and a half years, Dr. Thompson found that the average time to delivery following drainage of the sac was twenty-nine hours.

Regarding fetal death *in utero*, he had never considered this an indication for termination of pregnancy. His experience of a fairly large series was that sooner or later labour would start spontaneously with no ill-effect whatever to the mother. He had frequently allowed women to carry a dead fetus for as long as three months without harm, and he had never had to perform induction for delayed labour in these cases.

If he were faced with the necessity of making a choice as to the best method of induction he thought he would advise quinine and oil combined with packing, to be followed by drainage of the amniotic sac if necessary. But experience warned him to be chary of routine; moreover, he knew that what he might advocate today he might condemn in the light of further experience in years to come. Also, as Dr. Green had said, one was very often called upon to adapt treatment to circumstances.

The means of escape in cases of failure depended, he thought, on circumstances. In a case of severe toxæmia progressively becoming worse, the fetus would often die. If this happened, perforation of the skull followed by douching out the brain matter would often be followed by immediate onset of pains and rapid expulsion. There was nearly always enough dilatation for this operation to be easily carried out. If the baby was still alive but dying, he waited until death occurred and then performed perforation (two or three hours, more or less, would not make much difference at this stage). If, on the other hand, the baby was alive and had a good chance of surviving if delivered quickly, Dr. Thompson thought that a lower segment section with drainage should be considered.

Dr. Thompson then described the instruments he had mentioned. He said that the uterine catheter consisted merely of a quarter-inch copper tube about fifteen inches

in length carrying a handle inclined at 45° at its proximal end. The other end had a uterine curve and its extremity was filed off horizontally so as to leave a sharp parabolic edge. This penetrated the amniotic sac and liquor appeared at the small drainage tube just forward of the handle. The latter was depressed and the business end was introduced alongside the fetal skull into the lower part of the uterus and was left *in situ* until the flow ceased. An assistant gently massaged the patient's abdomen. Portability and length rendered this a very handy instrument, and it had incidental uses, namely, for perforating the central *placenta prævia* and for draining the hydrocephalic skull. For the latter purpose it had no peer.

The packing tube founded on the principle of the Gerota tube modified by De Lee consisted of three parts—the tube which was about fifteen inches long and of three-eighths of an inch in diameter with a uterine curve on the distal end, the container made to accommodate six yards of three-inch three-ply gauze and the packing spindle with its sharp bifurcated end. The container was loaded with the gauze pack, the free end of which was passed over the horizontal bar above it (this prevented the gauze layers from adhering). The end was now picked up by the spindle, introduced into the tube and packed into the uterus by a to-and-fro movement of the thumb placed into the ring at the end of the spindle.

DR. H. M. FISHER (Adelaide) said he was surprised by the high incidence of inductions of labour at the Women's Hospital, Melbourne, as given in Dr. Green's paper. The incidence of this procedure at the Queen's Home, Adelaide, was increasing, but he thought it was very much less than Dr. Green's figures.

DR. R. F. MATTERS (Adelaide) said in his opinion quinine acted more as a sensitizer of the uterine muscle, rather than as a stimulant for the onset of uterine contraction. As such, it was very useful as premedication. He had noticed that when toxæmia was present, the uterine muscle seemed to be in a very irritable state, and so success with medicinal methods of induction might be helpful. He thought that artificial rupture of the membranes would succeed in starting labour in this type of case.

DR. R. BEARD (Adelaide) asked what dosage of pituitrin was used as part of the routine medical induction of labour. He had found that some patients had an idiosyncrasy to pituitrin, and in these persons it might lead to a sudden onset of violent uterine contractions. He thought that this fact might also be related to the *liquor amni* in the uterus. When oligo-hydramnios was present, it should be used with care and in small doses. He asked Dr. Green whether a rubber tube or solid bougie was favoured. He advised a thorough elimination treatment before medical induction was commenced in toxæmias of pregnancy. Since contracted pelvis was so infrequent in Australia, there should be little need for the use of induction in apparent disproportions between the foetal head and pelvis.

DR. F. W. BUDDY (Sydney) considered that in the ordinary medicinal induction of labour quinine played only a very small part in initiating the onset. He thought that the castor oil was mainly responsible. Following induction, quinine had been recovered from the placental tissue and the *liquor amni*. It was considered that a concentration of quinine of one in 90,000 might cause ill-effects in the uterus.

DR. JOHN CHESTERMAN (Sydney) said that he had also been impressed by the high incidence of induction of labour as mentioned by Dr. Green. Incidence was certainly three times greater than at the Women's Hospital, Sydney. There, induction of labour for disproportion was very seldom done, consequently its main use was in toxæmias and in post-maturity. He agreed that when a dead fetus was present, the patient should be left to come into labour naturally. With regard to the toxic effects of quinine on the infant, he had noticed on more than one occasion a very definite rise in the fetal heartbeat after its administration. He also thought that meconium-stained *liquor amni* was often associated with quinine administration.

It might be that these two signs indicated some effect on the fetus.

DR. A. M. HILL (Melbourne) said that the disadvantage of induction of labour by artificial rupture of the membranes was that sometimes it was days before labour commenced. This occurred particularly in premature cases, consequently it should be attempted only when the patient was within two weeks of full time. He asked Dr. Thompson what was his method of vaginal preparation preliminary to packing the cervix with gauze.

PROFESSOR R. MARSHALL ALLAN (Melbourne) said that they were still faced with the problem of finding the best method of induction of labour. No method at present in use was invariably effective. From their experience at the Women's Hospital, Melbourne, the time elapsing after artificial rupture of the membranes, before the onset of labour, had been found to be greater than that stated in publications from overseas. He was against the use of this method for induction of labour before the thirty-eighth week of gestation. It had been shown that one of the risks of surgical induction was infection of the placenta with *Bacillus coli communis*, leading to fatal death. When death of the fetus had occurred it was better to leave the patient to deliver herself naturally. In a series of 100 cases he had found that the administration of

quinine during the last few weeks of pregnancy had not shortened or improved labour.

DR. GREEN, in reply, said that he would like to explain that the large numbers of inductions referred to in his paper had been medicinal inductions attempted half-heartedly in cases in which success or failure was not of importance. If these cases were eliminated, he thought the incidence of induction of labour would not be greater than elsewhere. Artificial rupture of the membranes was an excellent method when labour followed, but when delay occurred the condition remaining was difficult to treat. He had been much impressed by Dr. Thompson's method of inducing labour by packing the cervix with gauze, and had every intention of trying the method. At the Women's Hospital, Melbourne, surgical induction for disproportion was being less and less used, but in these cases medicinal induction was used freely if the head was not fixed in the pelvis at term, or the fundus unduly high on measurement. He fully agreed that caution was necessary in the use of pituitrin. If uterine contractions had commenced, the pituitrin was not administered in the routine type of medicinal induction. He preferred to use a soft stomach tube rather than a solid one. It was apparent that a really satisfactory method of induction of labour had yet to be found. When it was discovered, obstetrics would become a much more pleasant specialty.

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President's Address.

PROFESSOR G. GREY TURNER (London) chose as the subject for his presidential address: "The General Principles Governing Surgical Intervention in Tuberculosis." He said he had chosen this subject because the congress was largely concerned with tuberculosis. He had from the beginning to confess, however, that he found himself in some difficulty, as he was unaware of the special features of the Australian problems; but as he intended to speak only about general principles, this was a matter of small moment.

Professor Grey Turner said that it had always been customary to speak of "surgical tuberculosis", but in his view this title presupposed a wrong attitude, for, although there were many cases in which surgery played an important part in the treatment of tuberculosis, there was none in which it alone sufficed. This point, he said, was emphasized by the blatant excursion of surgery into the domain of the chest, where quite clearly it was only an incident, though admittedly a most important one, in the long and continuous treatment of so serious a disease.

The question of surgery in tuberculosis, Professor Grey Turner said, had repeatedly been prominently brought before the profession in connexion with tuberculosis of the neck glands, and the importance of the subject was demonstrated by the conflicting views expressed. Many years previously his interest in this aspect of the matter was first aroused; at that time surgeons were accustomed to treat all patients with tuberculous neck glands by

excision, but with most varying results. The dissections were often extensive and thorough, but though some patients remained permanently cured, in many others tuberculous manifestations soon appeared elsewhere, usually in other groups of glands, but sometimes in the internal organs. In not a few patients the disease became generalized.

For long, Professor Grey Turner said, his efforts to discover a reason for the discrepancy in the results was unavailing, and he was reminded of the lament of Omar Khayyám:

Myself when young did eagerly frequent
Doctor and saint, and heard great argument
About it and about, but ever more
Came out by the same door as in I went.

After years of diligent searching in the wards, in the *post mortem* rooms and in the laboratories, Professor Grey Turner said he found that tuberculous neck glands ranged themselves into two main types. These were, firstly, those that were entirely local and resulted from a portal of infection situated in the pharynx or naso-pharynx (tonsils or adenoids), and, secondly, those for which the portal of infection was either the mediastinal or the mesenteric glands. The tuberculous condition of the neck glands in the second category was simply the result of tuberculous disease firmly rooted in the trunk of the patient. The possibility of the mediastinal and the mesenteric glands being a portal of infection, Professor Grey Turner pointed out, explained the less common cases of glandular infection in which tuberculous glands first appeared in the axilla or the groin. These were often attributed to an external portal of entry on the surface of the body, but for all practical purposes such a focus was never found.

¹ The meetings of the Section of Surgery with the Section of Medicine and the Section of Radiology and Electrical Therapy on the treatment of peptic ulcer, and with the Section of Radiology and Electrical Therapy on renal tuberculosis have already been recorded.

The result was that when a surgeon thoroughly removed neck glands the portal of infection for which had been the naso-pharynx, he was dealing with a local disease. Before the operation the portal had probably been dealt with by removal of the tonsils or adenoids, or had spontaneously recovered, and there was a fair probability that when the glands were removed the whole consequence of the infection was extirpated. Professor Grey Turner said that these cases furnished the good results of which he had spoken, and that he had watched such patients for as long as thirty-five years without further trouble occurring.

When the portal of infection was the mediastinum or the mesentery, Professor Grey Turner said, the primary manifestation could not be directly treated; and after even the most successful operation on outlying glands the focus remained and was prone to give rise to other tuberculous manifestations. Thus it would be seen that in the one group of cases operation was the most important part of treatment, whereas in the other group operation was but an incident in management. This, Professor Grey Turner pointed out, was the crux of the matter; and it should be realized that in the great majority of cases in which an operation for tuberculosis might be required, there was a latent focus, which could not be treated directly, and which must be favourably influenced by other means. When surgical intervention was contemplated, it was necessary first to raise the resistance of the patient before operation, so that the resources of the natural curative mechanism were brought fully into play; secondly, it was necessary so to conduct the surgical procedures as to avoid such a sudden lowering of resistance as would naturally follow shock and blood loss; thirdly, it was necessary to spend time and care in after-treatment, in order that latent foci of disease should not be lighted up and further activity be caused.

Professor Grey Turner went on to say that the problem had been brought prominently to the notice of the medical profession in connexion with tuberculosis of the kidney. Even when it was possible to be reasonably sure that the main lesion involved only one kidney, it ought to be assumed that the portal of entry might still be active, or that the tubercle bacilli were "not dead but sleeping", as was engraved on the headstones in old country churchyards. In these circumstances any lowering of resistance might enable such a focus to resume activity and to spread. Professor Grey Turner quoted in this connexion Mr. Hugh Lett, who had held, in his Bradshaw Lecture delivered at the Royal College of Surgeons in 1936, that 40% of persons with tuberculous kidneys gave evidence of the same disease elsewhere, and that the greatest measure of success was attained only when time and care were taken to raise the resistance of the patient before operation, and to keep it raised afterwards by a prolonged period of convalescence under conditions such as those provided by a sanatorium. Mr. Lett had emphasized the truth of these observations from his own experience, and had further in this connexion quoted Marion, who found that whereas the prospect of cure for tuberculous patients after nephrectomy was as high as 80% among the well-to-do, the percentage fell to fifty for those who had not time or money enough for pre-operative and post-operative care.

Professor Grey Turner pointed out that the same principles held good for all other forms of tuberculosis, and were especially important in pulmonary cases. As far as patients with pulmonary tuberculosis were concerned, much more important than the technical skill exercised in the actual performance of such operations as thoracoplasty were, first, careful selection of those to whom surgery might prove helpful, and, secondly, their proper management and continued after-care.

In conclusion, Professor Grey Turner said that there might be much latitude as to the measures to be employed in raising the resistance and in keeping it at a high level, and that these measures might vary in various circumstances. None the less, the main principles were rest, good food and fresh air. One other factor was essential, namely, continuity in treatment; for there was no place for intermissions in the care of tuberculous patients in whose treatment operation might play a part.

Umbilical Hernia.

Dr. L. M. McKILLOP (Brisbane) read a paper on the management of large umbilical herniae. He pointed out that while the treatment of moderate-sized herniae often presented little technical difficulty, the case was entirely different when the hernia was very large or was of the obstructed or strangulated type. Many of the very large and uncomplicated herniae were of many years' standing. The essential cause was primarily an inherent weakness of the wall in the vicinity of the navel plus the further thinning and weakening associated with repeated pregnancies, obesity, flatulence and the later development of bronchitic signs.

The treatment was to be considered under three headings: that of moderate-sized herniae, of very large herniae, and of obstructed and/or strangulated herniae. Dr. McKillop pointed out the necessity in the first two classes of thorough pre-operative preparation, especially in regard to measures designed to increase the tone of the weakened abdominal muscles, to reduce flatulence and weight, and to accustom the woman to a period of recumbency after operation. He then pointed out that as far as remedial measures were concerned there were three essential requirements: to remove the sac in its entirety, to approximate as far as possible the *fascia transversalis* and the recti muscles, and to order the subsequent wearing for some weeks at least of a suitable abdominal belt. It was not of great moment in any but the largest herniae whether the fascial approximation was done from side to side or by the transverse overlapping method advocated by the Mayos. In very large herniae when it was decided to operate, great care should be exercised to reduce the risk to the patient by estimating the renal and cardiac functions. Dr. McKillop advocated the rectal injection of paraldehyde for purposes of anaesthesia; this was almost devoid of risk and was not usually followed by vomiting or shock. In some cases fascial grafts had to be used or fascial strips employed in the form of cross-lacing as advocated by Gallie. Dr. McKillop then showed a series of lantern slides to illustrate the types of incision, methods of suturing and of inserting tension stays of silkworm gut tied over fine rubber tubing. He pointed out the grave complications of obstruction and strangulation and the difficulties of dealing with such conditions. He had had no personal experience of the method of fascial coaptation in which vertical incisions were made far out in the anterior sheath of each rectus muscle, as practised by Wood Power and described in *The British Medical Journal* of May 8, 1937, but thought that the method was an advance. The after-treatment of large umbilical herniae was of extreme importance. He advocated the retention of a flatus tube in the rectum for some days plus the use of acetylcholine and pitressin. In the event of symptoms of ileus supervening, he advocated the administration of a spinal anaesthetic. With regard to results, he had chosen his cases, and in the fifteen-year period (1920 to 1934) had operated upon thirty-three patients, of whom six died. Twenty-four of the remaining patients were regarded as clinically cured.

Dr. A. M. CUDMORE (Adelaide) discussed the question of operative technique. When some divergence of the recti was present he made a transverse incision down to the rectus sheath, then pushed the recti aside and opened the posterior sheath, which he overlapped during the repair. There was often much trouble in freeing the omental adhesions to the interior of the sac. Adhesions of the intestines were not common and did not usually cause much difficulty. It was often necessary to remove some omentum, as there might be no room inside the abdomen. Dr. Cudmore had been using chromicized catgut during recent years; previously kangaroo tendon had been used. He tied the silkworm gut sutures over the dressing. It was difficult to assess the results with any accuracy, as one usually lost sight of most public hospital patients. He agreed with Dr. McKillop regarding after-treatment.

SIR HUGH DEVINE (Melbourne) was interested to hear Dr. McKillop's experiences in bringing the recti together; his own experience was that this was often impossible in adipose female patients. Fat people, in whom umbilical

hernia most commonly occurred, usually had something serious the matter with them, and therefore the time spent over the operation was a matter of great importance. A long anaesthetic predisposed to post-operative vomiting and pulmonary complications. If the time of operation could be reduced to one hour or less this would be a big advance.

Sir Hugh Devine employed a wide incision above and below the hernia, retracting the skin and superficial fascia down to the neck of the sac by wiping with a large towel. He then encircled the neck of the sac with an incision and withdrew the sac. The intestines usually slipped back into the abdomen, the omentum adhering to the sac. He then removed the sac and adherent omentum; through the wide incision he was able to get a large overlap, and considered that two or three inches were necessary. He employed plain number 4 catgut. In his experience patients did very well after a short but not after a long operation.

DR. W. J. CLOSE (Adelaide) pointed out that some patients were liable to consider the umbilicus as being of some cosmetic value. If they were not warned that it would be removed at operation they might complain, and in his experience had done so.

PROFESSOR GREY TURNER (London) discussed the causation of umbilical hernia. Repair of the small hernia seen in infancy did sometimes occur spontaneously, but at other times certainly did not. The condition should be taken more seriously. Many people went through life with a small hernial sac which in middle life, with increasing weight and consequent increased intraabdominal tension, increased progressively in size. For a time the fat concealed it, and when it was noticeable to the patient it was quite large and correspondingly serious. In view of the comparatively high mortality after operation, Professor Grey Turner was almost invariably inclined to advise operative rather than conservative treatment. There might be some hesitancy about advising operation, as the patient was often not a very suitable subject; a good many umbilical herniae, however, became strangulated. Although the mortality after repair of umbilical hernia was fairly severe, it was appalling following strangulation. He therefore advised early operation as the lesser risk, trying, of course, to make operation as safe as possible by choosing the best time to operate and getting the patient in as good a condition for the operation as possible.

He joined issue with Dr. McKillop in regard to exploration of the abdomen. The operation was associated with quite enough risk as it was. One should, however, go carefully into the clinical history and be quite certain that the hernia was really the cause of the symptoms of which the patient might be complaining and attributing to the hernia. A position of comfort on the operating table was of great importance. Fat patients could not lie down without discomfort and cardio-vascular embarrassment. This embarrassment continued under the anaesthetic and added to the risk, particularly of hypostatic pneumonia. The head and shoulders should be kept bent forwards.

Professor Grey Turner avoided the use of a general anaesthetic whenever possible. At times he used spinal anaesthesia, but preferred local anaesthesia supplemented when necessary by general anaesthesia. He hesitated to remove the omentum and conserved it whenever possible. He liked to know that the omentum at the end of the operation was between the intestines and the operation incision.

One technical point worth mentioning was that it was his practice to cut away that portion of the sac which might be adherent to the intestines and leave it attached to the intestines when returning them to the abdomen. He liked Mayo's operation, but it was not always possible to carry it out satisfactorily. It might be impossible to bring the recti together. He asked if kangaroo tendon was used extensively in Australia. He mentioned the filigree method, which had been largely discarded, but with which some very good results had been obtained.

He thought the mortality following radical cure was from 2% to 5%. In the follow-up of patients after operation it was essential that the surgeon himself should see the patient as it was often possible to feel a buried recurrence. With operation for strangulated hernia he dealt with the strangulation, but did not attempt to repair

the hernia. When operating on little children he always conserved the umbilicus.

DR. MCKILLOP, in reply, agreed with Dr. Cudmore that the Mayo method of closure was the best. It was necessary to remove redundant omentum when its return to the abdomen would lead to increased abdominal pressure. He was glad to know of Sir Hugh Devine's method of exposing the anterior rectus sheath by wiping the superficial tissues down with a towel. He stated, however, that he did not consider there was any necessity for great hurry with the rectal administration of paradehyde as an anaesthetic. He gave it one hour before the operation in a dosage of 45 minims per stone of body weight. Patients did not vomit and the operation was practically shockless. He did not like spinal anaesthesia very much.

He agreed with Professor Grey Turner regarding the necessity for operation in childhood if early spontaneous cure did not take place. Operation was not very difficult. The essential part of the operation, as with inguinal herniotomy, was to tie off the neck of the sac. As Professor Grey Turner had said, the position of the patient on the operating table was of great importance. Kangaroo tendon was being used less now as the best quality tendon before the War had been produced in Germany. He did not think that kangaroo tendon ever disappeared from the body; it became part of the tissues of the abdominal wall. In Brisbane kangaroo tendon was prepared at the hospital to which he was attached, and he found it satisfactory in every way. His results had been good, but he pointed out that operation had been carried out only on the most suitable cases, and he had often refused operation. He did not regard a slight bulge in the operative area as due to recurrence of hernia. It was due rather to the fact that the abdominal wall was very thin.

INCISIONAL HERNIA.

DR. A. E. COATES (Melbourne) read a paper on incisional hernia. He based his remarks on an analysis of 144 patients with incisional hernia treated at the Royal Melbourne Hospital from 1931 to 1936. There were 40 males and 104 females; 83% were of middle or old age. Fifty-seven herniae followed operations for appendicitis; seventeen followed gall-bladder operations; thirty-six followed operations for female pelvic complaints. Of all the patients, 63% were aware of the presence of the hernia within six months of the operations.

The lower paramedian incision accounted for 23% of all cases, the upper paramedian incision for 14%, and the lower mid-line incision for 30.5%. There were 27% of the herniae following McBurney's muscle-splitting incision. There were only three herniae recorded in Kocher's sub-costal incisions. Drainage had been employed in 35 cases at previous operations, but probably more patients were treated by drainage and the fact was not recorded. In 20 cases there were complications, such as cardiac or respiratory disease, diabetes and nephritis. Thirty per centum of the patients suffered from intestinal obstruction; five died. The remaining three deaths were accounted for variously as cancer of the pancreas, renal disease and carbuncle of the neck.

The actual mortality of the hernia and its complications was 2%. This low mortality, Dr. Coates held, should encourage surgeons to repair these herniae, which were often crippling to the patient, involved the wearing of cumbersome supports, and eventually led to serious and obstructive complications.

The methods of repair had included the use of *fascia lata* sutures in 16 cases, silk in two cases, and overlapping of the aponeurosis in 11. Prophylaxis was the prime consideration in dealing with this disability. The planning of the original incision so that a minimum of injury to the abdominal wall was inflicted, the correct placing of drain tubes, careful suture of the peritoneum with chromicized catgut, inserting a stay interrupted suture above the drain tube, and through the peritoneal layer, should help to minimize the occurrence of hernia.

Through-and-through silkworm gut sutures were to be condemned. Tags of omentum made their way between sutures and a potential hernia was thus in being. More frequent use of the transverse or oblique incision in upper

abdominal work, especially in stout subjects, would relieve the surgeon of anxiety during the time of closure of the peritoneum, render the operation easier, and ensure a sound abdominal wall. Transverse division of the rectus, provided careful suture was performed, left a strong scar. A consideration of the natural skin folds in the abdomen was as desirable as it was in the neck.

Dr. Coates supported Wakeley and Davies in their enthusiasm for the transverse or oblique incision in appropriate cases. He said that Zivov had shown the value of the Kocher incision in gall-bladder operations, and had contrasted the results with those following the use of the upper paramedian incision.

The recent investigations by H. P. Jenkins on the tensile strength of catgut indicated that chromicized catgut was the only material which could be relied upon to keep the peritoneum and deep aponeurosis together for the requisite period until healing occurred. Care should be taken to prevent distension after abdominal operation, a potent factor in causing wound disruption.

Dr. Coates then discussed the repair of incisional hernia. He said that herniae following the use of the McBurney incision were often inevitable, because of the necessity for draining abscesses in the right iliac fossa. The diffuse bulge, or the finger-like process, might be repaired by dissection, excision of scar and identification of anatomical layers and careful suture.

For large paramedian or mid-line hernia opening the sac and returning the contents to the abdomen were preliminary steps to the dissection of the neck of the sac. Closure of the mouth and neck of the sac by continuous chromicized gut number 1, followed by a few interrupted fine silk sutures, would usually suffice to effect sound repair. Dissection of the muscle and aponeurotic layers, suture with fine silk (interrupted) or darning the gap with fascial strips, would prevent unnecessary tension, which was the enemy of sound healing. Careful haemostasis was always essential. Overlapping of the external aponeurotic layer by Mayo's technique, or splitting the rectus sheath longitudinally some distance from the suture line would sometimes help.

There were not many even large herniae which could not be repaired by careful dissection, removal of redundant omentum and careful suture.

SIR HENRY NEWLAND (Adelaide) pointed out that the abdominal incision was a means to an end and the patient should not be caused future trouble as a result of this means. The incision could be regarded under two headings, namely, the advance into the abdomen and the retreat therefrom. In the advance normal anatomical structures should be damaged as little as possible. Muscle should be split rather than cut. Sir Henry Newland mostly used a paramedian incision. After dividing the anterior rectus sheath and retracting the rectus laterally he made an incision through the posterior sheath as obliquely as possible. This made all the difference to closure afterwards. With a thin patient who had a diaphanous sheath he used a transverse incision. For appendix operations in the male he always used the McBurney incision. Prior to appendicectomy in females a vaginal examination under anaesthesia was an essential preliminary.

In the retreat from the abdomen he never used catgut thicker than "0" or "00" for the McBurney incision. With this incision it was his experience that vomiting caused approximation of the muscle rather than opening of the wound. He was particularly careful in suturing the transversalis muscle. When operating in septic cases it was important to employ sutures that would not lead to strangulation of muscle fibres. With appendiceal abscess there were fewer post-operative herniae when no sutures were employed at all.

SIR HUGH DEVINE said that there was much food for thought in Dr. Coates's paper. He agreed entirely with all Sir Henry Newland's remarks. He had learnt a lot from Sir Alexander MacCormick with regard to opening and closing the abdomen without doing any damage. In Sir Alexander MacCormick's septic cases no herniae occurred. In acute abdominal surgery the surgeon should keep away from the mid-line of the abdomen, which was

the area under greatest tension. The incision should be kept high with a septic gall-bladder and low with a septic appendix. If this was done there was scarcely any need to suture the abdominal wall at all. On the other hand, the mid-line exploratory incision was very frequently followed by hernia. Here the tone was greatest and the sutures had to be tightly tied to approximate the wound; this led to necrosis of the muscle and subsequent hernia. One valuable technical point in acute abdominal surgery was that the incision should be made directly over the lesion. If the position of this was unknown, Sir Hugh Devine made a small muscle-splitting incision about two and a half inches long; it was possible to insert the hand, previously lubricated with vaseline, through such an incision and to explore the whole abdomen. When once the lesion was located it was attacked through a small incision directly over it.

DR. K. MACKENZIE (Auckland) mentioned a method of repair of large herniae occupying the greater part of one lower quadrant of the abdomen. He exposed the *tensor fasciae femoris* and the *fascia lata*, and swung the whole structure round into the gap in the abdominal wall. This was possible as the nerves and vessels entered at the upper end of the muscle. By this method he had got good results in a patient previously regarded as incurable; and another patient, a female, who had had her abdominal wall so repaired, went through pregnancy without trouble.

Professor Grey Turner was interested to hear that so few herniae had occurred after the use of Kocher's incision.

Dr. Coates, in reply, stated that he had adopted Sir Hugh Devine's method of exploring the abdomen, and could speak of its great value. He agreed that the region around the umbilicus was a most unfavourable area in which to have to operate. He thanked Sir Henry Newland for mentioning his method of using an oblique incision through the posterior rectus sheath, and Dr. Mackenzie for his method of repairing large herniae in the lower part of the abdomen.

Gastroscopy.

DR. JOHN HORAN (Melbourne) read a paper entitled "Gastroscopy with the Flexible Gastroscope". He demonstrated the Wolf-Schindler flexible gastroscope. He stated that with this instrument a gastroscopic examination could be made in the out-patient department of a hospital with little discomfort to the ambulatory subject, and that the only indication for his hospitalization was the presence of pyloric obstruction with retention of gastric contents, in which case he was admitted to hospital twenty-four hours before gastroscopy for repeated gastric lavage. As a routine measure several days before the proposed examination the patient should be given a "barium swallow" and his chest should be examined by X rays (screening); this was necessary to exclude the presence of any lesion which might prevent the safe passage of the gastroscope through the oesophagus. The contraindications were then considered, obstruction at the cardia being the one most frequently encountered. Dr. Horan pointed out, however, that if the stomach tube used for emptying the stomach passed through the cardia without resistance, then the gastroscope might be introduced with safety.

The Schindler technique in gastroscopy was then demonstrated by a Kodachrome film, which had been prepared by Dr. Frank Tate, of Melbourne. In this film the patient was given a preliminary injection of atropine sulphate and codeine phosphate, and surface anaesthesia of the pharynx and hypopharynx was obtained through a special perforated tube. The stomach was then emptied by the gravity method. The gastroscope was introduced with the patient's head flexed, and the head was extended during the passage of the instrument through the oesophagus. The various depths of introduction and the method of orientation were then demonstrated on the "phantom stomach".

A series of slides was shown to illustrate the gastroscopist's impression of the normal gastric mucosa, the angulus and the *musculus sphincter oestri*, the pylorus and pyloric action, benign and malignant gastric ulcer, the "virtual ulcer stomach" (after Schindler), the "post-operative stomach" and the various types of chronic gastritis.

Strangulated Hernia.

DR. J. B. FULTON (New Zealand) had forwarded a paper entitled "Strangulated Hernia". He stated that this condition had tended to increase in recent years and that a mortality of approximately 20% was not to be regarded with complacency; it was to be doubted whether treatment had been improved in recent years. In 1900, C. L. Gibson gave the following figures: of 354 patients with strangulated hernia and gangrenous gut, 120 died, a mortality of 34%; of 226 patients treated by resection and primary anastomosis, 58 died, a mortality of 26%; of 63 patients treated by resection and primary anastomosis, 14 died, a mortality of 22%. Dr. Fulton then gave the figures for all cases of strangulated hernia (inguinal and femoral only) recorded at the Dunedin Public Hospital for the years 1915 to 1936 inclusive. He said that a total of 121 patients were treated, of whom 24 died, a mortality of 19.8%. The gangrenous cases had numbered 14, and the results were: of eight patients treated by resection and primary anastomosis, five died; of five patients treated by exteriorization only, five died; one patient had been treated by replacement only, having collapsed, and this patient had died; eleven deaths had thus occurred out of a total of fourteen patients. In ten other cases death had been due to peritonitis, to shock (sometimes due to spinal anaesthesia) or to pulmonary complications.

Dr. Fulton then said that he had three suggestions to make in connexion with the methods of treatment, but that before doing so he would make a plea for clearer and better guidance on this subject in the standard textbooks of surgery.

Dr. Fulton's first suggestion was concerned with the technique employed when the gut was of doubtful viability. He said that the usual procedure advised was to bring the loop out, wash it with saline solution, and then to pass a rod through the mesentery or to fix the loop with sutures at the neck of the sac; when this procedure was followed at the Dunedin Base Hospital it was followed by 100% mortality. The wound could not fail to become infected, whether the bowel gave way or not, and the intestinal obstruction was not adequately relieved on account of the normal sphincter action of the inguinal canal. The normal tone of the external oblique and other flat muscles of the abdomen tended to close firmly and to compress the lumen of any bowel that was brought through the inguinal region; on this account, if an enterostomy was planned, even a muscle-splitting incision in the right or left iliac fossa was not so favourable as a median subumbilical incision. Dr. Fulton stated that he would suggest that this method of exteriorization of doubtful gut was unwise and should not be recommended. An attempt should be made to improve the circulation in the affected bowel by the application of hot towels and by sufficient delay; if this procedure was successful the loop could be returned to the peritoneal cavity; if it was unsuccessful the affected loop should be brought out through a short mid-line subumbilical incision, the unhealthy gut should be cut off, and a catheter should be tied into each open end. Dr. Fulton thought that the practice of leaving a loop of doubtful gut in the wound was dangerous and inadvisable. The process of heating by hot towels the dark-coloured intestine need not be hurried, for a long operation under local anaesthesia did not cause shock; many advantages were to be gained by the use of local anaesthesia. Finally, Dr. Fulton stated that evidence had been produced to show that the sudden relief of an obstructed bowel was dangerous; slow decompression, for example the release of the contents at the rate of 100 cubic centimetres every thirty minutes, was advisable. This procedure might also lessen shock, which was sometimes a grave problem.

The second suggestion that Dr. Fulton made was concerned with cases in which the gut was gangrenous and the patient was in good condition. He said that the orthodox treatment was resection and immediate anastomosis, the mortality at the Dunedin Hospital being 62.5% and at most other hospitals approximately 50%. The occasions for this procedure were really very few, but in the rare cases in which it was to be used it would

be preferable to bring out the bowel through a mid-line incision rather than to work through the neck of the sac. This would permit of a good loop of bowel being brought down and of the free removal of the proximal loop, which was essential to a safe anastomosis. The use of the intra-nasal suction duodenal catheter should be recommended after resection of the bowel, and it would probably obviate the necessity for an enterostomy.

Dr. Fulton further stated that in the vast majority of cases, when the bowel was irreparably damaged, the simpler operation would certainly be the best treatment. This consisted of a median subumbilical gun-barrel enterostomy, with complete removal of the gangrenous loop, but in children an anastomosis was generally to be preferred to an enterostomy. The tying-in of a catheter in each opening, and slow decompression of the proximal obstructed gut, aided in minimizing shock and in keeping the wound free from contamination for the first few days. Much care was needed in the post-operative treatment of these patients; morphine, saline solutions and blood transfusions should be given as required, and nothing should be given by mouth unless the intra-nasal suction duodenal catheter was used, when fluids could be given.

In reference to cases of gangrenous bowel when the patient was in poor condition, Dr. Fulton made his third suggestion. He said that the text-books usually advised the making of an artificial anus in the inguinal region, but this was probably not the best treatment, as the wound became grossly infected and the artificial anus did not drain. He therefore suggested the performing of a median subumbilical gun-barrel enterostomy, with a catheter tied into each limb of the enterostomy. At a later stage, not too long deferred, the intestinal pathway should be reconstituted by operation.

Discussing anaesthesia, Dr. Fulton gave figures to show that a much lower mortality resulted from operations at the Dunedin Public Hospital performed under local anaesthesia than under general anaesthesia; out of thirteen operations there were twelve recoveries, which gave a mortality of 8.4%. The performance of operation on patients under local anaesthesia need not be unduly troublesome, since methods had been devised of calming the patient so that he slept or dozed throughout. Dr. Fulton said that he referred to morphine-hyoscine premedication, which incidentally reduced the likelihood of shock. He believed that no reduction was likely in the present high mortality of strangulated hernia until all surgeons used local anaesthesia.

DR. G. BELL (Sydney), in opening the discussion, stressed the high mortality. He wondered whether drainage of the bowel following resection would save some patients who did not recover. Many patients, of course, came far too late to the surgeon. It was important to wash out the stomach before operation. Dr. Bell expressed a strong preference to local or spinal anaesthesia. He asked in what cases drainage should be employed and what was the best method. Salines and the duodenal tube were of very great use.

DR. L. MCKILLOP (Brisbane) stated that the treatment of strangulated hernia had been a reproach to the medical profession for a generation, and the mortality was not lessening. The patient, of course, was often doomed before the surgeon saw him. The factor that killed the patient was the fall in blood pressure due to histamine decomposition products from that portion of the bowel the circulation of which was cut off. If the bowel had been strangulated for some time, the patient would die. It was his practice to make an ample incision away from the hernia. A carefully administered local anaesthetic was far less productive of shock than any general anaesthetic, after which the patient's condition would often become rapidly worse.

The surgeon should note the extent of the damage to the gut, and decide what to do. If an independent incision was not used, the hernia might not be reduced completely. The first thing to do was to get rid of the poisonous contents of the bowel. If the bowel was gangrenous, a generous excision must be made or the patient would not recover.

DR. J. NEWMAN MORRIS (Melbourne) stated that the results seemed to be bad whatever one did. If the bowel was dead, it had to be resected whatever the risk, as the risk was always greater if it were left. Nearly all his patients had been old people and correspondingly poor surgical risks. A strong argument for the use of an independent incision was the fact that the hernia was not always the cause of the intestinal obstruction. Dr. Morris had seen two or three cases in which the hernia had been operated upon and the cause of the obstruction left untreated.

DR. BRONTE SMEATON (Adelaide) referred to a patient who had recovered under the most unfavourable conditions. She was mentally deficient and pulled out her stitches, the wound suppurated, she developed a faecal fistula and finally made a good recovery.

PROFESSOR G. GREY TURNER (London) stressed the fact that the mortality was world-wide. He considered that they were going to learn a great deal from Russia with regard to dealing with emergencies, as a result of the present policy of the establishment in big cities of "acute surgical hospitals" with permanent full-time staffs.

With modern surgical development there was less attention paid to the subject of hernia than by the old teachers. It was also unfortunate that these patients were seldom seen by students. For this reason alone they should consider the extreme importance of having students in residence at teaching hospitals.

If any complication had developed in a hernia, Professor Grey Turner felt that operation should be advised. Often the patient did not complain directly of the hernia. He might complain only of vomiting, which might lead to delay in his being seen by his general practitioner. Professor Grey Turner stressed the fact that unexplained vomiting should be regarded as an emergency and should call for an early visit. He had seen patients with small strangulated hernia treated for gastritis. He wondered whether portion of the mortality might be due to the fact that the old operation of herniotomy was seldom done. Radical cure had nothing to do with the life-saving procedure of herniotomy. The hernia should not be repaired at operation, because it did add to the risk.

It was absolutely essential to use local anaesthesia. There was no field in surgery where it was more important or more satisfactory. With a properly administered local anaesthetic the operation could be done in its entirety.

It was often difficult to decide whether to carry out bowel resection or not, and it was impossible to lay down rules. The condition, however, of the mesenteric vessels should be carefully noted and great pains should be taken to see if they were pulsating. If they were thromboosed the bowel would die. Resection was accompanied by a high mortality. For some years Professor Grey Turner had tucked in doubtful areas of the bowel rather than carry out resection. If a resection was done it had to be generous, a foot or two of bowel being removed on the proximal side of the resection, the area from which there was likely to be most toxic absorption being taken away. No patient was ever too ill to be denied a chance of relief by operation. He had seen some astounding recoveries. Sometimes it seemed that the patient would not have a chance if resection was carried out. In such cases he divided the neck of the sac and left the bowel in the sac with drainage. Sometimes such a patient would unexpectedly get well. Another point was that he felt that many patients lost their lives because they were sent to hospital. Operation in their own homes would have given them a better chance.

He hesitated to carry out enterostomy. A high enterostomy could lead to death after the patient had survived his initial obstruction and operation.

Traumatic Rupture of the Urethra and its Treatment.

DR. W. H. J. MOORE (Melbourne) read a paper entitled "Traumatic Rupture of the Urethra and its Treatment". He said that his paper was based on a study of the thirty-three patients with traumatic rupture of the urethra admitted to the Royal Melbourne Hospital during the

previous ten years, and that the cases were divided into three groups according to the nature of the accident that had produced the injury. These groups were: (a) rupture due to the passage of instruments, one case; (b) rupture due to direct injury to the perineum, twenty cases; (c) rupture due to a fracture of the pelvis either produced by a crushing injury or due to a street accident, twelve cases.

Dr. Moore said that the injury that had occurred to the solitary patient in the first group was due to the passage of a cystoscope and that he mentioned it merely to sound a warning against inexpert use of sounds and catheters.

Speaking of his second group, Dr. Moore said that direct injury to the perineum was the most varied in the lesions produced and might give rise to bad late results. In two patients in this group the injury was so severe that a fracture of the pelvis, in addition to rupture of the urethra, was produced. One of these two patients died from his injuries shortly after admission to hospital, but the other, a woman, ultimately made a good recovery after a long stay in hospital. Dr. Moore gave her history in detail on account of the rarity of rupture of the urethra occurring in a woman and also to illustrate some of the principles of treatment; he also discussed the question of whether the patient's stay in hospital might have been lessened if suprapubic drainage had been instituted immediately after her admission. Dr. Moore thought that this might have been the case. He commended the later management of the case because the patient had been allowed some months to recover from the initial injury before a plastic operation was attempted and then one year before any attempt was made to improve the final result. Dr. Moore said that such restraint had everything to commend it and was certainly responsible for the excellent functional result ultimately attained.

Discussing the other eighteen patients in the second group, Dr. Moore said that their main symptoms were (i) hemorrhage from the urethra, present in all except two, (ii) inability to pass urine and (iii) pain and swelling in the perineum. In eight of these cases the only treatment necessary was the passage of a catheter, which was tied in in every case but one; this patient had an injury to the penile urethra. No difficulty was experienced in introducing the catheter, and it was therefore assumed that all these patients had an incomplete rupture. As far as was known, none of these patients had trouble later on.

Dr. Moore said that a description of the other ten cases in the second group would serve to emphasize the increasing tendency to use suprapubic drainage as the first step in treatment, and he considered the procedure to be correct. Of the ten patients in question, one died soon after operation and one died nine months after his injury from extravasation following the closure of a perineal fistula; three patients had persistent strictures for which they were still receiving treatment; therefore, in this group, of those who required operation half had died or were suffering from serious complications. Dr. Moore then discussed these ten cases in detail.

Coming to the third group, Dr. Moore said that it was interesting to note that of the twelve cases eleven had occurred during the preceding five-year period and seven had been due to street accidents; this type of lesion might therefore be expected to become more common. Of the twelve patients five died, four within a short time of injury and one three months later from apparent renal failure, although he had appeared to recover and had no symptoms of urinary obstruction. In spite of the variations in the injuries there was a remarkable unanimity in treatment, which was always primary suprapubic drainage in patients coming to operation. Dr. Moore said that this was certainly the proper treatment, as these ruptures were almost always intrapelvic. One patient in the series had had a rupture of the bladder in addition to a rupture of the urethra, and it was obvious that this would not have been discovered without operation.

The usual site of the injury, Dr. Moore said, was somewhere between the attachment of the urethra to the urogenital diaphragm and the base of the bladder; quite commonly the bladder and prostate were torn off the urogenital diaphragm and displaced backwards and upwards into the abdominal cavity, which caused a wide

separation between the divided ends of the urethra. The suprapubic approach was the best in this type of operation, since the distended bladder could be emptied and the blood clot removed from the cave of Retzius. It was essential that a catheter be introduced through the whole length of the urethra to act as a splint, keeping the bladder and prostate in contact with the distal urethra. Dr. Moore then discussed various methods for inserting this catheter, and concluded his remarks by saying that the most important thing was to insert the catheter properly and to learn the alignment of the urethra at the time of operation.

In cases in which separation of the divided ends of the urethra had not occurred, Dr. Moore said that when the bladder was opened an attempt should be made to pass a catheter, and if this could be done the patient should be left with drainage through a catheter and suprapubic drainage. If a catheter could not be passed, a sound catheter should be passed from each end of the urethra, the ends should be cut down, and the catheter should then be manipulated along the urethra to the bladder. Dr. Moore said that all the patients with a fractured pelvis who survived the initial period did well with the exception of one who had extensive pelvic injuries and in whom the suprapubic wound could not be made to close. He was for a long time in hospital.

Discussing treatment in general of patients with rupture of the urethra, Dr. Moore emphasized the necessity for employing the tied-in catheter as a first step; he stressed the importance of attempting catheterization only in the operating theatre and with the strictest precautions. Suprapubic puncture and aspiration with a fine trochar and cannula would be necessary only if there was to be any delay in getting the patient to hospital. An anaesthetic should not be necessary for catheterization, but the patient should be carefully prepared for the operation; if the attempt at catheterization was not successful, the surgeon should provide suprapubic drainage with the patient under anaesthesia. Dr. Moore further emphasized that an attempt at catheterization should be made only in those cases in which the injury was due to direct violence to the perineum; if the rupture was due to a crush or fall and the pelvis was fractured, suprapubic incision with drainage of the bladder should be the first step. In lesions of this type it was always possible that a catheter might pass through a tear in the bladder and drain urine from the peritoneal cavity, thus producing a false sense of security in the surgeon. In these patients the lesion could be remedied through the suprapubic incision at the time of the first operation.

In the case of rupture due to direct injury to the perineum, three courses were open after the bladder had been drained: (a) to do nothing further, and to leave the treatment of the injured urethra till later; (b) to explore the urethra by means of a rubber catheter inserted either from above or from below or from both directions; (c) to repair the urethra immediately. Dr. Moore then discussed these methods of treatment and stressed the necessity for arrangements being made for all these patients to be placed in the care of one surgeon, or of one group or team of surgeons, instead of being seen by many. This was necessary not only for the good of the patient, but also so that more efficient and certain methods of treatment might be developed by one surgeon or group of surgeons having sufficient experience in these rare conditions.

DR. G. H. BURNELL (Adelaide), in opening the discussion, said that the first method of treatment in cases due to direct violence was suprapubic drainage. In ruptures above the triangular ligament when cystostomy was performed a rubber tissue drain to the cave of Retzius was not sufficient. One patient he had seen had developed a perineal abscess and had died despite its drainage. He thought that his life could have been saved with lateral perineal drainage. Whether to operate on the urethra after suprapubic drainage or not depended on the condition of the patient, and no rule could be laid down. If primary suture was done all damaged tissue should be excised, as sutures would tear out of bruised and oedematous tissue. It was possible to excise two inches of urethra and still to appose the ends without tension.

SIR HENRY NEWLAND (Adelaide) also stated that suprapubic drainage was the first essential. He joined issue with Dr. Burnell with regard to the excision of damaged tissue. He thought recovery of this was very much better left to Nature. It was much better to wait for quite some time before further operation. In regard to subsequent stricture, he thought that the Hamilton Russell operation had not received the attention which it merited. With regard to supradiaphragmatic rupture, drainage was also essential. The main use of a catheter was to restore direct continuity of the urethra. It never paid to suture all excised tissue at the primary operation. It was much better delayed to a subsequent occasion.

DR. W. J. CLOSE (Adelaide), said that the French had the widest experience of this condition, and their practice was probably the best method of treatment. They exposed the rupture perineally and drained perineally, and he thought that this treatment should be employed. Stricture formation was periurethral rather than urethral and could be very dense.

PROFESSOR G. GREY TURNER (London) apologized for taking such an early part in the discussion, but stated that he could restrain himself no longer as he entirely disagreed with practically everything that had been said. The simple reparative powers of the urethra had been lost sight of. It had a good blood supply and would recover if only protected from sepsis. The worst thing one could do was to pass a catheter which would cause certain infection, leading in turn to septic healing and scar formations. Every case should be treated by direct incision over the site of injury. It was necessary to use an adequate incision two or three inches in length in the mid-line with proper assistance and anaesthesia to cut into the haematoma and to evacuate all clot with a scoop. Next the ends of the urethra had to be found. The distal end was usually found easily and, although the proximal end might be found only with extreme difficulty, in his experience he had never had to resort to retrograde catheterization. The torn urethra should not be trimmed up at all, the two ends should be brought together and the roof and sides sutured, but not the floor, good bites of urethra being taken with No. 1 chromicized catgut. At this stage one could, if one wished, drain suprapublically. However, he considered it better to slit up the proximal segment, passing a catheter through this into the bladder. The urethra should be left entirely open. The skin should be approximated but not tightly, and the catheter fixed thereto. If there was any oozing the wound should be gently packed with gauze; after two weeks the catheter should be removed and the patient should then be left alone for four days; then a silver catheter should be passed into the bladder in the usual way, but this was not absolutely necessary. At the end of another fortnight the wound was almost healed and the patient passed urine naturally. After a month another instrument was passed and the findings on this occasion determined the frequency of future instrumentation. There was bound to be narrowing of the urethra, but no stricture and no symptoms. With extravasation of urine or abscess formation the whole of the affected area should be incised. The surgeon should not be in too much of a hurry to be drastic in the treatment of stricture, and bougies of excessive size should not be used.

The treatment of these patients by special departments had been discussed with the object of arriving at the best method of their management. It was high time that these definite principles of treatment were laid down.

DR. JOHN KENNEDY (Melbourne) congratulated Dr. Moore on his paper and convincing exposition of the subject. He referred to the Hamilton Russell dictum that the urethra was a ribbon and not a tube. If it was treated as a tube there would be trouble. He had done perineal section and got into trouble. He had had very great difficulty in finding the proximal end and had on occasions to perform retrograde catheterization.

DR. GEORGE BELL (Sydney) said that Professor Grey Turner's remarks were a counsel of perfection. He thought that in the country, with possible bad assistance and bad lighting, it might be better merely to make a large mid-line incision and to turn out the clot. A perineal swelling should always be incised.

Dr. Moore, in reply, said that he had not had Professor Grey Turner's wide experience. He had been influenced rather in the direction of suprapubic drainage by Cabot's dictum regarding the necessity for diverting the urinary stream in many urinary tract operations. In the series of cases under discussion, perineal section had been carried out in the earliest cases and had given the worst results. In the hands of those without opportunities to obtain the necessary experience, suprapubic drainage might occasionally be preferable to a badly carried out perineal section.

Delayed Testis.

DR. A. B. McCUTCHEON (Melbourne) read a paper entitled "Further Observations on Delayed Testis". He said that his paper was chiefly in the nature of a continuation of an earlier paper published in THE MEDICAL JOURNAL OF AUSTRALIA fifteen years previously, and based upon information gained at the annual medical inspection of the boys at Scotch College, Melbourne; he hoped that his observations would be of value since they were concerned with these earlier patients who had by now grown up. Dr. McCutcheon also pointed out that his paper was chiefly statistical and was not concerned with the question of treatment.

Dr. McCutcheon said that the investigation was based on the physical record cards of 3,197 schoolboys, from five to eighteen years of age. The boys were examined carefully in their first year at the school, and every succeeding year, and any abnormal features were noted and checked over; since 1919 special attention had been paid to the scrotal and inguinal regions. Owing to the effect of cold air, nervousness on the part of the child, and handling of the scrotum, the testis had a tendency to retreat into the inguinal canal, Dr. McCutcheon said, and therefore the standard adopted for the definition of genuine delayed testis was "any testis which, being found absent from the scrotum, could not be located in the inguinal canal or external ring, drawn down or coaxed down and induced to stay in the scrotum without tension". If the weather was cold, examination of the scrota was deferred for twelve months or more in the case of small boys from five to seven years of age.

Dr. McCutcheon then discussed the records of 3,197 boys examined over the period from 1922 to 1937, the boys being divided into two groups, Class I, whose ages were fifteen years and over, and Class II, under fifteen years of age. Of the total in Class I, 12 boys, or 0·37%, were found to have undescended testes, and in Class II 192 boys, or 6%, were found to exhibit delayed descent. The incidence of delayed descent of the testis in the 3,197 boys was 6·08%. The difference in incidence between Class I and Class II was very striking; 9% of boys in Class II had undescended testes, whereas 1·1% only of boys in Class I were so affected. It seemed obvious that the general developmental and physical changes occurring at the fourteenth or fifteenth year were responsible for this reduction in incidence, and this suggested the question of treatment. Was it not more reasonable, Dr. McCutcheon asked, to delay surgical intervention on any one patient until the effect of puberty had been discovered? It seemed possible to say that the majority of delayed testes appeared to attain their normal scrotal position before or about the age of puberty.

Speaking of the relationship of completed descent to the age of completion, Dr. McCutcheon pointed out that there had been no instance of bilateral delayed descent of the testes in a total of 5,000 boys after they had reached the age of fifteen years. This affected the question of the risk of sterility in patients who were not surgically treated, since one healthy testis normally placed should be sufficient to guard against this contingency. Follow-ups indicated that 74% of boys under fifteen years of age had completely descended testes at the age of sixteen years without treatment. In 55% of cases the condition was bilateral, in 30% it was right-sided, and in 15% it was left-sided. There was very little evidence of constant relationship between delayed descent and a poor physical type of boy, most of the boys being well developed. In a few cases the boys were short in stature with infantile genitalia, but they appeared to improve rapidly with the onset of puberty. Dr. McCutcheon further said that only four cases of

inguinal hernia were discovered in the 204 cases of delayed descent; he therefore retained his belief, expressed in 1922, that the supposed sequential relationship between delayed descent of the testis and inguinal hernia was not proved, and that the weight of evidence was against it.

Discussing the question of treatment, Dr. McCutcheon said that he had reached three conclusions. These were: (i) that, except in certain cases in which some surgical condition such as hydrocele, hernia, or torsion of the testis *et cetera* was associated, surgical intervention should be withheld at least in the first ten years; (ii) that if delay still persisted and the genitalia were under-developed, the exhibition of "Antuitrin S" or some similar preparation might be advisable; (iii) that if the testis still showed no sign of descent when the secondary sexual characteristics began to appear, surgical intervention was indicated.

Dr. McCutcheon said that in 1922 he had arrived at certain conclusions with regard to the condition of undescended testis, and that in 1937, with more material on which to work and more evidence, he saw no reason to alter his conclusions. They were: (i) that delayed descent of the testis was a common condition in boys under the age of puberty; (ii) that after the age of puberty the condition was relatively rare; (iii) that the hastening of development which was a concomitant of puberty played a part in completing the descent of the testis; (iv) that the sequential relationship between delayed testis and inguinal hernia was not proved and not supported by evidence, and (v) that the condition had a constant tendency to spontaneous cure, and that surgical interference before the commencement of puberty was contraindicated. Dr. McCutcheon concluded by reviewing the results of gonadotrophic treatment of undescended testis as summarized in *The Medical Annual* for 1937.

PROFESSOR G. GREY TURNER (London) said that at one stage he had thought that an undescended testis was unlikely to descend after the age of three years. He was quite satisfied now that the testis might descend up to and after the age of puberty. The medical officer at Rugby School had made a similar investigation to that of Dr. McCutcheon and had come to practically the same conclusion. In England, unless there were some complicating factors, treatment was not considered before the age of eleven, when hormonal treatment was started. Operation when necessary was carried out at the age of twelve to fourteen years, depending on the development of the patient.

Fractures of the Pelvis.

DR. J. B. COLQUHOUN (Melbourne) read a paper entitled "Fractures of the Pelvis". He said that pelvic fractures might be classified into two main groups, namely, fractures that did not involve the viscera, and fractures that did. During the preceding five years 139 patients with fractures of the pelvis had been admitted to the Royal Melbourne Hospital, of whom nineteen had died, a mortality of 13·75%. During ten years, 23 patients had been admitted to the Children's Hospital, Melbourne, of whom three had died, a mortality of 13%. At the Children's Hospital the fractures had been found to occur as frequently in girls as in boys; at the Royal Melbourne Hospital the males outnumbered the females by three to one.

Dr. Colquhoun said that fractures of the pelvis had become more frequent since the introduction of speedier motor cars during the preceding three years, and that in over 90% of cases the fractures were due to the patients' having been knocked down or run over by motor vehicles. In adults the fracture was due to severe trauma in which the pelvic girdle was crushed; the motor car was easily the most common agent. Other common causes of fractures of the pelvis were falling from a great height and being struck by heavy falling objects.

Dr. Colquhoun said that these fractures could be classified only in a general way. Injuries were usually severe, and most patients were brought to hospital suffering from profound shock; quite often there was an associated history of unconsciousness. Practically every form of skeletal and visceral injury might be encountered in these patients, and therefore treatment must be undertaken early in order to save life. Quite often the fracture of the pelvis was unimportant in the early hours of treat-

ment. If pronounced shock was present, treatment to relieve it must be instituted at once; the modern tendency was to employ blood transfusion at an early stage. Associated visceral or skeletal injuries must be treated *pari passu* with the shock. When the associated injuries had been contaminated with dirt from the street, prophylactic doses of anti-tetanic serum and of gas gangrene anti-serum should always be given. In cases in which shock was a prominent feature, and in which skeletal injury had occurred, fracture of the pelvis might be overlooked. Dr. Colquhoun stressed the need for suspecting pelvic fracture in any person who had been run over or who had sustained severe crushing to the body; he said that examination by means of X rays should be made while the patient was being taken from the casualty room to the ward, or immediately afterwards, by means of a portable X ray unit. Dr. Colquhoun said, however, that pain localized in the region of the pelvis generally made the diagnosis of pelvic fracture relatively easy. Inspection, palpation and rectal examination should be carried out as a routine measure, but good X ray photographs were essential to a clear picture of the extent of damage to the pelvic girdle. In cases of simple fracture without associated fractures in other regions, and in which no injury to the bladder, urethra or intestines appeared to have occurred, treatment for shock and some simple method of immobilization were all that were necessary.

At the Children's Hospital, Melbourne, Dr. Colquhoun said, only four cases of rupture of the urethra had occurred in 23 patients; three patients had slight haematuria, but no lesion of the bladder or urethra was discovered, and they recovered without complications. At the Royal Melbourne Hospital 19 patients had died as a result of fractured pelvis and associated injuries; the majority had died within a week of injury, and they all had severe injury of other parts. Bronchopneumonia developed in one case only; two patients died from septicaemia associated with extensive lacerations and rupture of the urethra, and sixteen died from severe shock that could not be relieved by treatment.

Discussing treatment, Dr. Colquhoun said that when fracture of the pelvis was suspected the patient should be placed gently on a stretcher with a pillow under the knees, to secure flexion of the hips and knees, and the knees should be bound together. In most cases, X ray examination revealed little or no displacement, and a Bradford frame with a firm pelvic binder and a pillow under the knees would be satisfactory. If displacement had occurred, as a rule gradual traction was sounder practice than manipulation, on account of possible danger to the pelvic viscera if the second method was employed. If displacement of the acetabular portions of the pelvis or concertina deformity and displacement had occurred, both legs should be encased in plaster of Paris from the groin to the toes, with a thick pad of felt to protect the skin on the medial aspect of the thigh. When the plaster was hard a block of wood should be placed between the knees and a turn-buckle applied at the level of the ankle; alternatively, a Spanish windlass could be used to approximate the ankles. In this way reduction could be obtained gradually and maintained, with little danger of further damage to the pelvic contents before the fractures had united. Dr. Colquhoun said that this method might be used when the head of the femur was displaced through the acetabulum into the pelvis, and that he had found it superior to the complicated method of Maxwell and Ruth.

Dr. Colquhoun then referred to the question of treatment when visceral injury was present. He said that intraperitoneal rupture of the bladder was often missed, but that if it was diagnosed it should be repaired and the abdomen should be drained. In the case of extraperitoneal rupture, the bladder should be repaired and the extravasated urine and blood removed, and the region of the neck of the bladder should be drained. Dr. Colquhoun particularly stressed the fact that in rupture of the urethra rigid catheters or sounds should not be used. If a rubber catheter could not be introduced into the bladder it was advisable to perform perineotomy and to drain the bladder. In cases in which rigid catheters had been used with a certain amount of force, Dr. Colquhoun said, much trouble had been experienced, and perineal fistulae had generally

established themselves. In conclusion, Dr. Colquhoun said that suture of the urethra, like suture of cut nerves and tendons, should be left to those who had had special experience and training.

DR. GEORGE BELL (Sydney), in opening the discussion, stated that of the 232 patients admitted to the Sydney Hospital with fracture of the pelvis, 21 had died. He mentioned a patient in whom a catheter passed *per urethram* had entered the rectum, in which viscous, the *tuber ischi* was also found. Acetabular fractures were of great importance, and unless they were efficiently treated, a great number of such patients got some residual disability. Dr. Bell thought that the best method of treatment in this condition was to apply skeletal traction for some weeks. He inquired what Dr. Colquhoun considered was the best method of treatment of dislocation at the sacro-iliac joint. Fractures of the pelvis also had a bearing on the question of future pregnancy. One patient whom he had seen subsequently required Caesarean section. He also asked what was the best method of treating wide separation of the *symphysis pubis*. These patients were interesting, as they often developed a typical gait, a kind of exaggerated sailor's roll. With a ruptured bladder or urethra he considered cystostomy under local anaesthesia the correct treatment, with attention to the urethra later.

DR. E. F. WEST (Adelaide) described a method of treatment in a case of pronounced dislocation of the sacro-iliac joint by skeletal traction with a more or less improvised apparatus firmly attached to the sound leg and foot, from which the extension was applied. The extension was gradually increased, and it was important that a long Liston splint should be attached to the sound leg to prevent a lateral swing of both.

DR. JOHN KENNEDY (Melbourne) said that he was sure that many patients had been admitted to hospital with fractured pelvis and were left by the busy in-patient surgeon to the house surgeon or registrar to treat, with very bad results. A fracture could be easily missed at X ray examination. The most important sign of fracture was exact location of acute bone tenderness. Special attention should be paid to a tender portion of the pelvis during the radiographic examination. The two great groups of fractured pelvis were those that involved the pelvic brim and those that did not. It was important in acetabular fractures that the joint surfaces should be restored. Unless the surgeon was confident that restoration was perfect, open operation was necessary as soon as the patient was fit. It was always difficult to determine whether the rectum was injured, and a low intra-peritoneal lesion of the bowel might be very difficult to detect. Unless the surgeon was sure that there was no bowel lesion, the abdomen should be opened. Laparotomy under local anaesthesia did not cause the patient much harm. With gross damage to the rectum colostomy was essential.

DR. P. S. MESSENT (Adelaide) had recently obtained an apparently good result in one patient who had good function while in bed, the anatomical result being satisfactory. However, after discharge from the hospital, he could not run or ride a horse. The big problem was dislocation at the sacro-iliac joint, especially when gross displacement was present. He had seen only one case of acetabular fracture. This was treated with skeletal traction with a good result.

DR. A. M. CUDMORE (Adelaide) mentioned a patient in whom he could feel the head of the femur on rectal examination. The patient was treated by manipulation and then as an ordinary case of hip disease without abduction. He got a good result. The question of compensation frequently made it difficult to arrive at an accurate estimate of the final results, as one could never be certain how much pain the patient actually had.

PROFESSOR G. GREY TURNER (London) said that one point of general importance was the question of specialism. Many things certainly should be in the hands of specialists, but a fractured pelvis might be associated with so many complications that such a case should not be handed over entirely to fracture specialists too early. The man treating fractured pelvis required to have a wide surgical training. He was surprised to hear Dr. Kennedy mention the

frequency of injuries of the rectum. He himself over a long experience had never seen this condition associated with fractured pelvis. With a rupture of the urethra above the triangular ligament and with extraperitoneal rupture of the bladder, operation was absolutely essential. With the latter condition it was not necessary to suture the bladder and one could merely drain the space of Retzius. If the urethra was torn it was extremely important to get apposition and drain suprapublically. While treating complications one should not forget the associated skeletal injuries. He often saw patients get well from serious complications but have trouble later as a result of quite small fractures. Another complication of fractured pelvis was suppuration of a haematoma. This required extra-peritoneal drainage.

Generally speaking, Professor Grey Turner was very conservative in treatment. In the absence of complications he surrounded the pelvis with a firm bandage or strapping and applied extension whether displacement was present or not. If the injury was very extensive he put the patient in a plaster cast. With acetabular fractures he relied mostly on extension, but he was not completely satisfied that this was the best type of treatment. It might be possible to do more with local surgical intervention. Operation, however, was of great technical difficulty. He inquired regarding the treatment of wide separation of the pubis. This might be due to fracture of the articular surface or laceration of the ligaments of the symphysis. He had seen such a fracture occur during labour. The time spent in convalescence was of great importance and often neglected by busy hospitals. At the very least three months were required. Activity should be discouraged for a very considerable time.

Dr. Colquhoun, in reply, thought that with acetabular fractures something might be said for pinning the great trochanter. This might perhaps be better than Böhler's method. One thing that emerged from the discussion was that better results could not be expected unless the patient was given the same close attention as was given, for instance, to a patient after thyroidectomy. He did feel that sufficient meticulous care in the treatment and after-treatment had not been given.

He was not able to offer Dr. Bell any suggestion of great value with regard to the treatment of gross displacement at the sacro-iliac joint. A slight dislocation was quite apt to lead to low backache and sciatica. The only procedure that would relieve this was the Smith-Petersen operation of arthrodesis.

Dr. Kennedy's point was of great importance. Some patients, however, were unconscious, so it was obviously not practicable in these. If the patient was carefully handled, Dr. Colquhoun did not consider that a thorough radiological examination at the beginning caused any extra shock.

Surgery in the Aged and Debilitated.

DR. JOHN KENNEDY (Melbourne) read a paper entitled "Surgery in the Aged and Debilitated". He said that the same considerations applied to the debilitated as to the aged. In emergency surgery the matter was as a rule not difficult—the relief of a complication as a rule entailed a simple operation. The removal of a causal lesion was, however, a problem of a different order. It was with this type of operation that Dr. Kennedy proposed to deal.

In the preparation of an aged or debilitated patient it was wise that he should be in hospital for at least a week prior to operation. The respiratory system should be free from complications, the renal and bowel functions should be determined and improved, bodily and mental rest should be assured, sleep should be regulated and the patient should be kept warm—he needed handling as carefully as a baby.

In discussing anaesthesia, Dr. Kennedy said that spinal anaesthesia was not devoid of risk; he thought that it was sometimes responsible for subsequent renal failure. The choice as a rule lay between gas and oxygen on the one hand and local anaesthesia on the other. The latter was suitable for the thin, pulmonary or cardiac patient; the former was suitable for the stout, strong or nervy type of patient. Local anaesthesia was particularly valuable

because it entailed very careful handling of the tissues and organs by the surgeon; it also removed the temptation to "do a little more" that completed the operation, but added another to the failures.

Particular attention should be paid to the transport to and from the operating theatre; these people were sensitive to cold, exposure and discomfort.

Before operation was undertaken it was essential that an accurate diagnosis should be made as a result of complete and thorough clinical examination. The condition of all the systems should be determined and the operation should be completely planned before it was started. A change of procedure which could be undertaken with impunity in a young person might prove fatal in the aged. Simple uncomplicated procedures were safe, but difficult and prolonged operations were dangerous and a mishap might be fatal. Care and gentleness were of greater importance than speed. Certain operations could be split into stages or into a series of simple procedures which could be carefully carried out. The temptation to do the "little more" was greater with gas and oxygen than with other forms of anaesthesia.

Dr. Kennedy then dealt with surgery of the colon, of the gall-bladder, of the prostate and of the stomach, and applied to each region the general principles which he had already enunciated.

DR. J. NEWMAN MORRIS (Melbourne), in opening the discussion, said that he tried not to make any operation last longer than half an hour, whatever the conditions were. He was glad that the subject of the transport of the patient to and from the theatre had been brought up. He never hurried a patient off the table or allowed the theatre staff to handle him at all roughly. He thought that old people stood spinal anaesthesia very well. He also thought that restraining oneself from doing "the little bit more" at operation was a matter of very great importance. He did not like suprapubic puncture and had seen two deaths due directly to this. In treatment of such patients one could do only what was necessary. For instance, one should do simple mastectomy for fungating carcinoma of the breast and not a radical operation. He had one patient alive ten years after simple mastectomy for scirrhous carcinoma. Another patient, aged eighty-two years, had done well following suprapubic operation for papilloma of the bladder. Under present conditions there was some hope for the aged.

DR. N. C. SPEIGHT (Dunedin) referred to the transport of patients. It was his routine now to transport a debilitated patient in bed, on a special trolley, right to the operating theatre, and to return him after operation straight back to a warm bed. He was sure that this had been a very potent factor in the reduction of post-operative pulmonary complications.

DR. GEORGE BELL (Sydney) emphasized the need for a careful general examination of the patient. Except in very urgent work it was very important to confer with the physician. He always had the renal function estimated. Regarding the question of anaesthesia, he had returned from the War rather against spinal anaesthesia. Since then, however, he had changed his views and thought that with old people, more particularly prostatic patients, it was quite a good method. He was glad Dr. Kennedy had stressed the importance of doing operations in two or more stages. His preference was for morphine as a premedicant. He was not keen on the barbiturates and thought it possible that they might lead to pulmonary complications. He asked for information regarding the value of "Carbogen" as a prophylactic against pulmonary complications and also inquired regarding the technique of inserting a jejunal tube.

PROFESSOR G. GREY TURNER (London) did not think that the years mattered if the patient's symptoms demanded operative interference. "Knowledge came, but wisdom lingered." One should know when to hold one's hand and when to take a justifiable risk. The important consideration was the condition of the tissues, and the climacteric in both sexes appeared to be rather a dangerous period. If patients lived through this period, this taken in association with the fact that they had come through

previous illnesses or accidents, showed that their resistance was probably fairly good.

The family history was of great importance in the prognosis. If a patient said that he came from long-lived stock it was very valuable information. General habits of life were also of importance in assessing the risk. An active patient had a better outlook. He was afraid of the patient who asked for a little time to make his will before the operation, while the patient who kept a tight control of the purse-strings did not usually intend to die.

The question of environment was also of importance. One should try to suit it to the particular requirements of the case. If, for instance, one put an old man, used to sleeping in a room with a fire, between blankets and in a woolly nightgown, into a modern hospital with plenty of ventilation and between sheets it was really almost enough to kill him. The surgeon should be prepared to operate in the patient's own environment and occasionally in his own home, especially in emergencies. Not only the material, but the psychological environment was of importance. The young and efficient nurse was not always the best person to nurse an old or debilitated patient. He preferred the kindly old sister.

Extreme care should be taken with regard to premedication. He entirely agreed with Dr. Bell that it might lead to chest complications. The patient who did not take an anaesthetic particularly well, but who coughed and vomited, often fared best. As a premedicant morphine completely satisfied him. He was a great believer in local anaesthesia. It might, however, interfere in old people with tissue healing, and certainly tissues were more susceptible to sepsis if infiltrated with a local anaesthetic. In many ways chloroform was one of the best anaesthetics and would come into its own again.

At operation the surgeon should do what was necessary and be content. It was better to have a living problem than a dead certainty. The patient should be as comfortable on the operating table under the anaesthetic as without it, and he was pleased to hear Dr. Kennedy insist on the importance of extreme gentleness. Old people did not stand blood loss well; although time was important, an extra five minutes spent in stopping bleeding was well

spent. The use of through-and-through sutures should not be lost sight of. Old patients very often would not live long enough to get an incisional hernia. Comfort and nursing in convalescence were especially important.

Professor Grey Turner was particularly afraid of chest complications. He was a great believer in the mechanical emptying of the chest and the patient should be instructed to cough at frequent intervals after operation. He thought that the use of carbon dioxide was helpful, but it should not be overdone.

After operation he did not worry particularly about getting the patient's bowels open. Strong purgatives should never be given; they might upset the patient considerably. The passage of flatus should be encouraged. He believed in the administration of small doses of strychnine and small enemata and something should be given by mouth to give the intestines something to do. Attention to the bladder was important. If the patient was not doing well, the surgeon should make sure that the patient was not carrying a lot of residual urine. It was a great psychological stimulus to get patients up early. They should be given every latitude and should never be denied a cup of tea. If a patient had been in the habit of taking large amounts it should be supplied to him freely; a serious illness was not the time to try to change the habits of a patient.

Dr. Kennedy, in reply, said that there was nearly always something one could do for the aged. He used suprapubic bladder drainage with a large trocar when the bladder would hold thirty ounces. In reply to Dr. Bell, he stated that he always inserted a jejunal tube two or three feet below the flexure. It was essential for the tube to go well down for a distance of six or eight inches into the bowel. It was also necessary for some omentum to be placed between the jejunal visceral peritoneum and the parietal. If this was done, the fistula closed easily.

He made routine post-operative use of carbon dioxide administration for five minutes in each hour after the patient left the theatre. Patients should be encouraged to cough or vomit and the wound should be tightly strapped so that they could do so without pain.

Section of Naval, Military and Air Force Medicine and Surgery.

President: F. T. Bowerbank, M.D., M.R.C.P., New Zealand.

Vice-Presidents: R. Fowler, O.B.E., V.D., M.D., Ch.B., F.R.A.C.S., Victoria; S. G. Gibson, M.C., M.B., Ch.B., Tasmania; J. C. Storey, O.B.E., V.D., M.B., Ch.M., F.R.C.S. (Eng.), F.R.A.C.S., New South Wales; Ernest Culpin, M.B., Ch.M., F.R.A.C.S., Queensland; S. R. Burston, C.B.E., D.S.O., V.D., M.B., B.S. (Melb.), M.R.C.P. (Edin.), South Australia.

Secretary: F. H. Beare, M.D., M.R.C.P. (Lond.), D.P.M., South Australia.

COLONEL F. T. BOWERBANK (Wellington) read a paper entitled "The Physical Efficiency of Recruits for the New Zealand Permanent Forces". He said that in 1934 the medical regulations for examination of recruits were revised, for no changes had been made in the method or standard of examination for many years. Consequently no account had been taken of the lessons learned from the Great War nor of modern methods of investigating cardio-vascular, respiratory or nervous efficiency. The revised regulations provided for urine examination, blood pressure, cardiac efficiency and Ishihara colour vision tests and a more comprehensive questionnaire concerning previous illnesses. Medical boards, consisting of a president with war experience and an assistant medical man, were appointed in certain cities.

Colonel Bowerbank said that he had noticed an apparent deterioration in the post-war youth of the civilian popula-

tion, and he considered the revised examination provided an excellent opportunity to test this impression. Accordingly he examined the records of recruits who had enlisted during the final years of the depression. As unemployment was most acute at that time, these youths were probably chosen from nearly double the number, and as they were drawn from all grades of society they were representative of the youth of the country as a whole. The ages of the candidates ranged from eighteen to twenty-four years. After each batch was examined he obtained the impressions of the members of the medical boards, and it was generally agreed that in appearance and physique they were most disappointing. Before discussing details, Colonel Bowerbank emphasized the fact that he was dealing with the physical efficiency of the accepted recruits rather than their physical development.

He spoke first of their height. Of the one hundred and eighty youths who enlisted in the artillery, only

twelve were under five feet nine inches and 19·2% were six feet and over. There was no minimum height in the air force, and 47·8% of the recruits were under five feet eight inches. At the time of enlistment 53·3% of these youths weighed less than eleven stone and 14·2% less than ten stone. They were reexamined after two and a half months' training, and it was found that 59% now weighed over eleven stone and only 6·7% less than ten stone, proving that many of them had been under weight when they enlisted.

Colonel Bowerbank then discussed "body build"—the relationship between age, height and weight. It was important because those who were tabbed as "overweight" were more able to endure severe physical stress, and this group increased in size with training. He concluded that the New Zealander was, as a whole, of the overweight type. The effects of training were again evident, but were less satisfactory, when chest measurement was considered. Of the thirty-eight recruits who were five feet nine inches in height the average measurement was only 36·6 inches, and after two and a half months' training it was thirty-eight inches. Comparison of chest expansion measurements taken before and after training showed some improvement.

Colonel Bowerbank was of the opinion that the importance of blood pressure readings had been much exaggerated, but they formed a useful part of every routine clinical examination, because essential hypertension had been accepted as an aggravation of the conditions of active service. Of the recruits under review, 93% had a systolic pressure of over 120 millimetres of mercury, 65% to 69% over 130 millimetres, and 32% to 35% over 140 millimetres. After training, pressure had decreased in the latter group, but in 90% of the trainees it was still over 120 millimetres. The fall in diastolic pressure was most marked after a period of training. According to the standards of British and American insurance companies even these figures were dangerously high, and it seemed probable that the New Zealander had a higher normal blood pressure.

Tests of cardiac efficiency were also made. Of the recruits examined over 50% had a pulse-rate of over eighty when resting. The numbers decreased slightly after two and a half months' training. Tested one minute after exercise the rate was over eighty per minute in 60%. The reexamination showed a great improvement, but the pulse rate was generally unduly high, and Colonel Bowerbank was of the opinion that a persistently rapid pulse was peculiar to the New Zealander, and that his cardio-vascular efficiency was low.

He then drew attention to the rejection of candidates. Fourteen out of forty had been rejected for reasons which, under the old regulations, would not have been diagnosed. Recruits were subjected to tests unknown in 1914, and he was convinced that each test was essential. Once a soldier was attested he was the responsibility of the State. He also referred to the generally poor dental condition revealed by the examination.

In conclusion, Colonel Bowerbank said that he thought that his findings called attention to a grade of physical fitness that was too low for a country which was largely rural, and stressed the fact that in modern warfare it was not only the soldier whose condition and morale were tested to the utmost. In time of war it might be necessary to mobilize the whole of the young male adult population, and it should be the aim of the government to have a healthy people. He quoted the example of the German, Japanese and Russian rulers, and urged universal physical training. England had awakened to the necessity for a coordinated plan. Those who left school early were often content to drift, and the government which considered that it was responsible for the education of the young was also responsible for their physical fitness.

MAJOR-GENERAL R. M. DOWNES (Melbourne) welcomed the paper as raising valuable points in the efficiency of recruits and the interrelationship between Australian and New Zealand forces. He paid special attention to the possible differences between the pulse rate and the blood pressure between New Zealand and Australian recruits. Referring to his war experience in Palestine, he regarded

the New Zealand troops he saw there as the finest lot of physical savages he had ever seen. He referred to the recruiting of the territorial forces in Australia, in contrast with the experience in New Zealand, as being satisfactory, as in a recent recruiting drive the militia forces were raised to the figure asked for.

COLONEL S. R. BURSTON (Adelaide) referred to the level of blood pressure discussed by Colonel Bowerbank, and said that his experience as medical officer to the Tramways Trust in Adelaide was not in accordance with the New Zealand figures. In examining men whose average ages were between twenty and twenty-four years, he found that a diastolic blood pressure of over 90 millimetres was apparent on very few occasions. Any man reporting for work with a diastolic blood pressure over 90 millimetres of mercury was not recommended for labouring work, but was quite capable of driving a tram or doing less strenuous work.

MAJOR E. L. COOPER (Melbourne) referred to the exercise tolerance tests described by Colonel Bowerbank, particularly with regard to the fact that even after two and a half months' training a large number of recruits had a pulse rate of over 80 per minute one minute after the termination of exercise. This would not be accepted by the Royal Air Force as efficient, but he pointed out that these tests frequently failed in first-class athletes. Major Cooper detailed his experience with Melbourne University students, and stated that the blood pressure reading of these men was lower than the figures quoted by Colonel Bowerbank for New Zealand recruits. In Australia the systolic pressure was rarely above 130 millimetres of mercury and the diastolic pressure rarely over 80 millimetres in young adult males. In Colonel Bowerbank's tables it was of interest to note that many of the recruits who had a high diastolic blood pressure on enlistment apparently showed a lower diastolic pressure after two and a half months of training. Major Cooper referred to the method of taking blood pressure and the importance of standardization of the method in using this as a routine examination of recruits.

DR. W. CHRISTIE (Adelaide) referred to his experience in medical examination of school children and of applicants for admission to the Public Service. He suggested that the variations from normal recorded by Colonel Bowerbank might have been due to the fact that the normal adopted was not the correct normal for New Zealand. He pointed out that the standards for New Zealand school children showed that the children were taller and heavier than English children of the same age, and that in New Zealand they had adopted Canadian standards rather than English standards. With reference to the chest expansion of the recruits, Dr. Christie pointed out that the chest expansion of world-famous athletes was often low. In his experience the diastolic blood pressure of Australian adults was usually about 80 millimetres of mercury and the systolic blood pressure was in the neighbourhood of 120 millimetres. He detailed the exercise tolerance tests he adopted, and stated that the pulse rate usually returned to normal within twenty-five seconds of cessation of exercise. Dr. Christie also referred to the physical training in schools which was being carried out to improve the physique of the children, and commented on the absence of gymnasiums in these schools.

Colonel Bowerbank, in his reply, stated that the blood pressure had been taken with the recruit in the horizontal position, and he agreed that standardization of the method was necessary if blood pressure was to be used as a routine medical examination. Colonel Bowerbank pointed out that athletes were not always physically efficient and that in the examination for the Royal Air Force some athletes had been deferred because of failure to pass tests which they succeeded in passing on a later occasion. He stated that these men might have been temporarily unfit owing to infections or other causes.

First Aid.

COLONEL F. A. MAGUINN (Sydney) had forwarded a paper entitled "Some Practical Considerations in First Aid".

He discussed the scope, organization, application and place in Voluntary Aid Detachment training of first aid, which he described as the application of the best measures available in emergency to relieve the sufferer and make his transport safe and comfortable until he could receive skilled attention. He said that there had appeared a tendency to widen the scope of first aid until it resembled junior medicine or surgery. This was wrong. First aid was essentially simple and should be limited to temporary measures. It was necessary to have some organization to control the general scheme of first aid in any district or State and to arrange general and financial matters. An important part of first aid organization was concerned with teaching and instruction, which should be carried out by medical men who were interested in the work. Lay instructors also did useful work, if qualified. Both men and women should undertake training in first aid, and home nursing should be included in the course.

Colonel Maguire then discussed the first aid treatment of shock, wounds, fractures, poisoning, venomous bites, drowning, burns and scalds, and injuries to surfers.

He gave advice concerning dressings and drugs useful to the first aid worker. After the injured person had been treated, the problem of transport should be considered. The patient should be protected from the sun, wind and cold, and transport should be quick, safe and comfortable. Rapid transport, even in an ambulance, was often dangerous. Ambulance cars should be placed at central depots and should be available at any hour. Organization and instruction in first aid should be so arranged that it would easily conform to a national scheme in time of national emergency. If designed in military fashion, it should take its place in army organization without undue dislocation.

DR. S. L. DAWKINS spoke as an instructor in the Saint John's Ambulance Brigade, and stated that many of the men of the brigade were also in the Australian Army Medical Corps, the Naval Reserve, or the Voluntary Aid Detachment service. He pointed out that the organization of first aid treatment must progress or it would go back, and that a critical review from time to time of the methods and of the booklet issued by the Saint John's Ambulance Association was necessary. He noted that 9,000 persons were given assistance by Saint John's Ambulance members in South Australia during the last year. The majority of these were for minor injuries, but even minor injuries occurring at some distance from the city, as in the bush, required more treatment than injuries in the city. In other words the locality determined the nature of the treatment. In some instances the usual splints could not be put on at the site of the accident. The patient might have to be moved from the road before treatment could be carried out. He suggested that treatment should be reduced to the simplest possible type and that if the victim was near a hospital or doctor it was not necessary to apply the routine methods of splinting as described in the manual. With regard to wounds, he suggested that it might be wiser simply to cover the wound with the first aid dressing rather than to attempt sterilization by iodine. He pointed out that first aid workers were not taught the dangers of iodine; especially when painting with iodine was followed by hot fomentations, blistering might occur. Dr. Dawkins commented on the control of haemorrhage by indirect pressure, which, in his opinion, was often inefficient, and he regarded it as better treatment to apply a tourniquet immediately and then dress the wound. He also mentioned the difficulty in teaching diagnosis, and suggested it was not necessary for the first aid workers to decide more than that the part was badly damaged and required splinting. The decision as to whether a fracture was present or not could be left until the patient arrived at hospital. Dr. Dawkins discussed the training of first aid workers and their attendance at public hospitals to gain further experience. He criticized the transport of injured persons at high speed in ambulance wagons, and suggested that patients were frequently subjected to a further degree of shock by this transport and that the few minutes saved were more than offset by the harm done to them. He also discussed

the necessity for uniformity in stretcher work as taught in the Australian Army Medical Corps and Saint John's Manual, and suggested that in the manual the stretcher exercises should be placed more prominently in the earlier portion of the book. Dr. Dawkins demonstrated the first aid cabinets which had been evolved for use in the home and in remote places in the State.

LIEUTENANT-COLONEL E. RUSSELL (Adelaide) referred to the importance of this meeting of the section, in that for the first time the relations of Saint John's Ambulance Brigade to this section of Naval, Military and Air Force Medicine and Surgery had been recognized. He referred to the importance of the Cadet Division of Saint John's Ambulance training children at school. He also referred to the danger of over-educating first aid workers, and while agreeing that hospital experience was very useful, he suggested that this should be limited to the more senior men in the brigade.

COLONEL A. J. G. RUSSELL suggested that members of the Voluntary Aid Detachment and the Saint John's Ambulance Brigade should both go to hospital for first aid training. He suggested that the Thomas splint drill should be taught to all members and said that this had been written up in a small booklet and was available. He pointed out that medical officers to Saint John's Ambulance Association might in the future be difficult to obtain, as lectures *et cetera* were given without payment.

REVEREND JOHN FLYNN spoke of the danger of a little knowledge, and mentioned some of the amazing things that had been done in the courage of ignorance. He referred to the first aid work of the Aerial Medical Service, and stated that some people regarded this service as rather an aerial ambulance system than a medical service. As the distances concerned were so great (being 300 to 400 miles), the first aid should, in Mr. Flynn's opinion, be given by a medical man; first aid conducted by amateurs was, he thought, dangerous when the patient had to be transported so far. In many instances an immediate operation had to be performed by the Flying Doctor, and when an accident occurred in a remote place the doctor had to accompany the aeroplane to render first aid before transport to hospital commenced.

MAJOR-GENERAL R. M. DOWNES (Melbourne) spoke of the debt they owed to Dr. Dawkins for sponsoring the discussion of first aid work in the section. He referred to the great potential value of Voluntary Aid Detachment work in war time, and the importance of peace training, particularly for women, in Voluntary Aid Detachments, who could replace men in many army medical units. He agreed with Dr. Dawkins that the first aid manual required revision and that Saint John's Ambulance Association in London welcomed criticism and would modify the manual to meet criticism. He referred to the fact that most first aid workers were inclined to do too much treatment, and he pointed out the danger of the application of a tourniquet, with its accompanying risk of gangrene. Finally he emphasized that the importance of first aid work was to stress the application of warmth, of rest and of calmness.

COLONEL F. T. BOWERBANK, the President, in the absence of Colonel Maguire, closed the discussion, and agreed to visit the headquarters of the Saint John's Ambulance Brigade in London and transmit the opinions of the section to the authorities.

Arms and Anophelines.

GROUP CAPTAIN ROBERT FOWLER (Melbourne) forwarded a paper entitled "Arms and Anophelines", in which he gave an appreciation of the military significance of malaria. He divided the subject matter into six sections: (i) biographical, (ii) biological, (iii) historical, (iv) epidemiological and clinical, (v) tactical and strategical, (vi) problematical.

In the biographical section Group Captain Fowler used the first person singular and described his first-hand experience of malaria with the Australian Imperial Force in Palestine and Syria. Though it was years ago, the

nightmare of Damascus after the capitulation, he said, was always with him; the price of victory was exacted to the last blood corpuscle by malignant malaria. A revival of interest had occurred as a result of a round Eastern tour at the beginning of this year. It was now easier to appreciate, partly at least, the significance of the fact that half the Australian continent lay within tropical latitudes adjacent to huge Asiatic "reservoirs" of infectious disease. It so happened that the direction whence came this threat to Australian public health coincided with the direction of possible attack on Australian national security. Coincidentally, therefore, whilst sanitary science ranged the regions of the north, military science scouted the same localities. It was in these areas that large scale military works were being undertaken; it was in these areas that military operations of the future might be envisaged.

In the biological section Group Captain Fowler gave an outline of the somewhat complicated form of parasitism exhibited by malaria; and he drew attention to the origin of the idea that the bite of an insect carrier could transmit disease in man. He gave a list of communicable diseases thus transmitted, with a comment on the importance of entomology to military medicine.

In the historical section—the longest part of the paper—Group Captain Fowler sketched the influence of malaria on civilization and military ventures from the earliest times. He said that the history of Palestine provided an interesting commentary on the military significance of malaria. From the time that Abner fought the battles of King David to the time when Allenby fought the last crusade, Armageddon had always been both a key position and a hotbed of malaria. The current interpretation of the scriptures, which regarded Armageddon as the last great battleground of the forces of good and evil, appeared to have little justification. In the relevant chapter (Revelations XVI), which was devoted to describing the distribution of the seven plagues by seven angels from seven vials, verses 16 and 17 read: "And he gathered them together into a place called in the Hebrew tongue Armageddon and the seventh angel poured out his vial into the air." This, Colonel Fowler held, was obviously a reference to malaria (Italian, *mala aria* = bad air). At all events history indelibly associated Allenby, Armageddon and anophelines. Malaria was one of the principal tactical weapons used by Allenby in turning the flank of the Turks by way of Armageddon. For nearly a year before he struck, he pinned the Turks to a line encompassed by malaria, knowing full well that his sanitary service was better than theirs. No material alteration in the nominal strength of the opposing force occurred during this period, but the effect of the unilateral ravages of malaria was worth waiting for; it more than turned the scale in his favour at the time of Allenby's triumph.

In the fourth section, Group Captain Fowler explained that the point of view of the epidemiologist was collective; that of the clinician was individual. The epidemiologist thought of malaria as a disease of a crowd, herd, colony or community; the clinician worried about the diagnosis, prognosis and treatment of a sick man.

In the fifth section Group Captain Fowler stated that the medical service was charged with: (i) the care and evacuation of the sick and wounded, (ii) the prevention of disease. Roughly these responsibilities corresponded with the tactical and the strategical use of the medical service. Preventive medicine should endeavour to facilitate the capacity of the force to reach the tactical stage by care in selecting recruits and protection during concentration, movement *et cetera*. Curative medicine should consolidate tactical strength by removing ineffectives and recovering them as early as possible.

In the sixth section Group Captain Fowler asked the interested student to go further by himself. He might delve, for example, into such questions as: (i) Did the Australian aborigines suffer from malaria? (ii) What variety or varieties of anopheline were responsible for transmitting malaria in northern Australia? (iii) What were the habits and breeding places of these mosquitoes? (iv) What influence would increased air transport have

on military malarialogy? (v) If Japan cut a strategical canal through the Isthmus of Kra, what hygiene difficulties would be encountered? (vi) If a naval base was built at Darwin or an air base in the Gulf of Carpentaria, what epidemiological factors would have to be considered? (vii) In the event of war, was there a probability of Australian forces operating from Singapore, tropical Australia or New Guinea? If so, what plans existed for combating tropical disease? (viii) Should the general staff study epidemiology? (ix) Of what use were "Atebrin" and "Plasmoquin" in military medicine? These and many other questions, Group Captain Fowler thought, might usefully occupy the time of our problematical student.

MAJOR R. C. BASSETT (Adelaide) said that his own first experience of malaria, like that of Group Captain Fowler, was in Palestine during the Great War. As a regimental medical officer he knew little of the vast problems which confronted the higher command in the matter of hygiene of the army as a whole, but was brought face to face with the isolated difficulties of a single unit, and with malaria in its clinical aspect. His work with the Repatriation Commission had given him the opportunity of examining a large proportion of the sufferers from two States since their discharge from the army. Major Bassett then referred to the efforts of the authorities to control malaria in the Jordan Valley. Up to 1918 it was very widely believed that it was almost impossible for a white man to survive a summer in that region; but the results of prophylaxis were brilliant. Major Bassett recollects that, over a period of ten days in July, 1918, no soldier from two units attached to Anzac Divisional Headquarters appeared on sick parade. This was surely, he thought, a record for any unit in any place; and the fact that it occurred in the notorious Jordan Valley added to its significance and to the triumph achieved by the military authorities through preventive medicine. In the Turkish lines, which were close by, malaria, dysentery and pellagra were rife. In connexion with the local incidence of malaria, it was interesting to observe that so little of this infection should have reached the British lines despite the proximity of the enemy, in whose area the *Anopheles* was allowed to breed in millions. It was known that the mosquito vector did not travel far in still weather, but that it might make journeys of several miles in a wind. It would appear to have been greatly to the British advantage that the prevailing wind in the Jordan Valley, which they all found so welcome in the late afternoon, came from the south-east, and that the mosquitoes had little or no mechanical assistance in reaching the British lines from those of the enemy. But when, in September, 1918, the great advance began, it fell to the lot of two brigades to pass through territory which had been strongly held by the Turks, while another took a more southerly road through mountains with hardly any human habitation. A few days later there was a heavy epidemic in the two brigades, while the third escaped infection almost entirely. From Group Captain Fowler's paper it became clear to what degree military necessity had been responsible for the prevention of this scourge and for advances in its recognition and treatment.

After reference to an anti-malaria squad, trained in hygiene, and with a qualified malarialogist, which was employed in Malaya in connexion with the building of a new highway by private contract, Major Bassett said that it was disappointing to hear from so great an authority as Sir Leonard Rogers, that over the greater part of the malaria-stricken areas of the globe the *Anopheles* mosquito continued its deadly work as actively as if Ross had never existed. The United States authorities in Panama and Cuba, and the British War Office in Palestine, Macedonia and Malaya had shown what brilliant results could be achieved when there was the will, and had given an indication of what might yet be done by concerted effort. It should be remembered that national defence did not have its real beginning in the raising of a national force and its maintenance only, but that the general physical fitness of its people was as essential as the fitness of the army which was drawn from it. Modern

medicine had, however, made it reasonably certain that malaria would never again be responsible for the decline and fall of great empires, as it had been for the decadence of Greece and Rome.

Major Bassett referred to Australia's increasing responsibilities in the tropics, and expressed the opinion that in general little attention was paid to tropical medicine in Australian medical schools. Since, as Group Captain Fowler had so clearly pointed out, the northern areas and seas were most likely to be the scene of any future military or naval operations, Major Bassett held that in schools other than that at Sydney, the subject of tropical medicine was one which should engage attention more earnestly; the moment was opportune to make a plea for a greater effort in this direction.

There appeared to be an almost universal tendency on the part of some medical practitioners to regard as malarial any pyrexial condition developing in a subject even years after infection, and he had seen malaria diagnosed on evidence which should refute it overwhelmingly were the significance of the evidence fully known and appreciated. Such an attitude could have a material bearing on the question of compensation following service, and might be neither in the true interest of the soldier nor to the advantage of the people.

Major Bassett pointed out that in successful military operations the army might be called upon to traverse rapidly country which had been held by a heavily infected enemy; in these circumstances probably no practicable preventive measure would entirely eliminate the possibility of material infection. Malaria was seldom fatal, but it lowered the resistance to such a degree that both pneumonia and dysentery often supervened. It was a vicious circle, so to speak, malaria predisposing to the other diseases and then adding to their severity and to the gravity of the prognosis. It could thus be stated that a lowering of the incidence of malaria would result in a decrease in that of certain other serious diseases which were wont to affect soldiers in the field.

Quinine remained the spearhead of the attack against malaria. "Plasmoquin", which had the power of destroying malignant crescents, had already fallen into some disfavour owing to its toxicity. The Malaria Committee of the League of Nations did not recommend its use, except for the special purpose of controlling the spread of the infection by devitalizing crescents and so preventing the infection of mosquitoes. "Atebrin", on the other hand, was very effective against asexual parasites, especially malignant tertian; crescents were not acted upon. Nevertheless, some authorities still preferred quinine.

In the matter of prophylaxis, quinine was still a drug of importance. The ideal anti-malarial remedy should have the following properties: (i) It should be able to destroy the sporozoites injected by the mosquito. (ii) It should have the power of destroying all asexual phases of the parasites. It was to these that all symptoms of the disease were due. (iii) It should kill the sexual phase of the parasites, which continued the life cycle in the mosquito and so spread the infection. (iv) It should be non-toxic to man. (v) It should be cheap, easily obtainable and easy to take.

Judged by these standards, none of the known anti-malarial drugs was the ideal. "Atebrin" and quinine occupied the first place, as they scored the largest number of points. But for massive use the cost of "Atebrin" for prophylaxis militated against its use; and the staining of the skin was another disadvantage in many cases. "Plasmoquin" might be regarded as too toxic for routine use.

Major Bassett discussed the technique of actual treatment and said that the tendency to give quinine other than by mouth was diminishing, and that both intramuscular and intravenous use were being more and more limited to one or two injections in only the most severe cases. Probably as a result of experience in the recent Abyssinian campaign, Italian investigators had recently introduced treatment by intravenous injection of adrenaline in weak but increasing concentrations, combined with the anti-malarial drugs. Adrenaline, it appeared, caused the parasites to be

brought more surely into contact with the destroying agents by reducing the size of the spleen and emptying them into the general blood stream. The results of this new method of attack appeared to be so encouraging that they might mark a real advance in treatment.

In conclusion, Major Bassett referred to the production of quinine and to the monopoly vested in Netherlands interests in Java. He pointed out that the cinchona tree was a native of South America, and he saw no reason why it should not be cultivated in many tropical hill districts of the British Empire, although the yields would probably not approach those obtained in Java. It was thus possible that Empire interests might necessitate the establishment of the industry, even at an economic loss.

Medical Organization with Mechanized Formation.

COLONEL C. G. SHAW (Melbourne) read a paper entitled "Medical Organization with Mechanized Formations". He said that the character of all arms of the military forces had been radically changed by the rapid development of mechanization, and the field medical units, although effective in the Great War, were unsuited for mechanized units. He proposed to put forward a plan for the organization of a field medical unit which would meet modern needs.

Adaptation of the present medical establishment to the divisional units—artillery, engineers, signallers *et cetera*—was simple, but difficulty arose when the needs of the cavalry were considered. The use of machine guns, tanks and armoured cars produced many new problems and called for complete reorganization. An increase in the size of the present type of medical establishment had been considered, but the plan was inelastic and extravagant, because men would be idle except during active operations. It had also been suggested that the size of the cavalry field ambulances should be increased; but this was impracticable and would not solve the problem. Colonel Shaw considered that the only way out of the difficulty was the creation of an entirely new unit, which would be capable of collecting the wounded during the time of the action and removing them to the rear of the fighting lines. This unit should be adaptable and capable of rapid movement. It might at times be necessary to reinforce the regimental medical establishments, and a motor ambulance squadron would meet all of these requirements.

He then gave details of the organization of such a squad, which would consist of headquarters and three troops. The headquarters should be under the command of a lieutenant-colonel or major, assisted by a major or senior captain, three captains, a quartermaster, stretcher-bearers, orderlies and other helpers. Each of the three troops should consist of two protected ambulance cars with the necessary helpers, under the command of a captain. The cars should be of standard pattern, with six wheels, and should be large enough to accommodate four patients. They should be protected by steel plating, and wireless equipment was desirable, but would mean great expense. With such cars wounded men could be removed during actual fighting. The organization should permit this motor ambulance squadron to form a main or advance dressing station, but it should also be remembered that the unit should always remain with the fighting forces. Consequently dressing stations formed by the ambulance troops should be collecting or wagon-loading posts only, and, when possible, the main dressing station of the nearest cavalry field ambulance should be used. The headquarters should be mainly administrative, and the units self-contained and capable of being detached and sent anywhere for duty if a mechanized unit was detailed for a special purpose.

LIEUTENANT-COLONEL D. L. BARLOW (Adelaide) said that the first point to be considered was when the casualty in an armoured fighting vehicle was to be attended to by a medical officer. He then pointed out that he was not in agreement with Colonel Shaw's solution, for he did not consider it to be possible for casualties in armoured fighting vehicles which were not out of action, to be dealt with until that particular phase of the action was over. In this type of fighting actions were of short duration and were quickly over. For this reason casualties would

have to wait until that particular action was over and would then be able to receive first aid from their mates. For those cases in which the vehicle itself was damaged and out of action, ambulances working on the same road would soon be able to attend to casualties, more especially from the immobilized armoured fighting vehicles. On those occasions in which armoured fighting vehicles had done their job and were falling back out of action, and if there was no ambulance on the spot to attend to casualties, then the crews of undamaged armoured fighting vehicles would have to pick up casualties and carry them back to the ambulance unit.

He would suggest that there should be one medical officer on the route on which each ambulance car was operating. However, he pointed out that the interval between being wounded and receiving attention would be no greater than obtained in infantry actions, and the problem would not be so very different. In his opinion, the protected car suggested by Colonel Shaw would be a great advance and would offer greater security both to the ambulance personnel and to the wounded. He went on to say that so far nothing much had been said about the machine gun regiments, which were rapidly moving units, and, he presumed, would follow the armoured fighting vehicles into action and if necessary hold a position. Evacuation from these units would be along the usual lines that applied to horsed cavalry units, and the machine gun regiments should be able to deal with their own casualties; but a central regimental aid post was not very practicable, for the tendency would be for such machine gun units to be spread over a large area. Here again the use of ambulance cars and extra medical officers, as suggested by Colonel Shaw, would have to do the clearing from and keep touch with these scattered units.

Colonel Barlow said that he did not agree that the increased medical personnel of regiments as suggested by Colonel Shaw would be desirable. These extra medical officers would then fulfil the rôle suggested for them by Colonel Shaw. In addition, he thought that the horsed cavalry field ambulance establishment would have to be modified to some extent.

LIEUTENANT-COLONEL C. W. ADEY (Melbourne) said that he agreed with the principle and with most of the details of the new unit suggested by Colonel Shaw. Only last year, during the camp of continuous training, other officers and men went into the question of collecting casualties from cavalry in retreat, and found it impossible with the present establishment existing for horse cavalry field ambulances. For the above reason Colonel Shaw's proposed unit would be of great value in dealing with casualties from the horsed units of cavalry divisions as well. However, he thought that there should be in each cavalry division two squadrons as suggested by Colonel Shaw, and only one of the present type of cavalry field ambulances. In conclusion, he was of the opinion that six-wheeled ambulances were absolutely essential.

LIEUTENANT-COLONEL VOWLES suggested that in all probability the transference of casualties from armoured fighting vehicles or tanks to ambulances would take place near a rallying point previously selected. Armoured fighting vehicles in any action would at some time or other tend to rally round this spot. When armoured fighting vehicles became disabled as a result of a direct hit or land mine, casualties from these vehicles would have to fend for themselves. It would be impracticable for other undamaged armoured fighting vehicles to pick up such casualties.

He stated that the present machine gun regiment was devised to bolster up the fire volume of cavalry divisions, which up till now had been inadequate. As a temporary measure these units now moved by motor vehicle and were not armoured. They did not have much protection, and in this respect would not differ from the cavalry units. For this reason he thought that Colonel Shaw's idea was a very sound one, and his scheme, if carried out, would fill a need that had long existed. One function, and a very useful one, that he would suggest for the protected ambulances would be to remove casualties from the area

where the led horses were placed, in which such casualties naturally tended to gather.

MAJOR-GENERAL R. M. DOWNES (Melbourne) stated that the opinions expressed by Colonel Shaw were those held by most officers of the medical services in the Third Military District. He pointed out that Colonel Shaw had given three possible solutions to a very difficult problem, and General Downes stated that he added his support for the formation of a new unit along the lines suggested by Colonel Shaw. He said that if armoured fighting vehicles and the two machine gun regiments were brigaded together, the idea of such a unit as Colonel Shaw had suggested would be quite all right; but that was not possible, for the above units were divisional troops and might become detached and sent to any part of the divisional front. Therefore it seemed to him that the problem needed a different answer from that suggested by Colonel Shaw, and the suggestions he would make were: (i) an increased regimental medical establishment and (ii) an increase in the transport of the present cavalry field ambulances.

He went on to say that he would like to point out that Colonel Shaw's proposed unit would depend entirely on petrol. It was an open secret that in time of war the supply of petrol in Australia, not great at any time, would have to be severely rationed, and it would not be difficult to imagine that after a very short duration of wartime conditions many units would become demechanized and would revert to horse-drawn vehicles. He would further suggest that all the so-called "prams" should be attached to headquarters of the units suggested by Colonel Shaw and not split up amongst the sections. There would then be a tendency to unify the control of these important vehicles.

He stated that in his opinion the medical personnel should try to collect wounded as soon as possible and not wait for the dangerous period of action to cease. Finally, the idea suggested by Colonel Shaw that the ambulance cars should be provided with wireless was ideal, but it would probably be a luxury which would not be made available for such vehicles. In such an action as pictured by Colonel Shaw, the ordinary divisional signal services would not be of much use to the medical vehicles.

COLONEL F. T. BOWERBANK (Wellington) stated that he could easily see that such an increase in the establishment of medical officers, as suggested by Colonel Shaw, would in time of war be a great drain upon valuable medical men in the community, for in the war of the future both the lines of communication and the civilian population would need very much more medical attention and aid than they did in former wars. For this reason he did not think that such valuable lives as those of medical officers should be exposed to any unnecessary risks. He was very afraid that if future wars lasted for any considerable time the supply of doctors would run short.

Colonel Shaw, in reply, stated that he did not agree with Colonel Barlow when he had stated that armoured fighting vehicles could pick up wounded. In the first place there was no room in such vehicles to put them, and in any case, if they did get a seat, they would only be a nuisance and impair the efficiency of that vehicle. He thought that there was a great need for protected ambulances, otherwise the wounded would have to be abandoned and they would have to take "pot-luck"; this was against the ideals of the medical services. He further suggested that the headquarters of the squadron should supply medical officers and cars for evacuation from the machine gun regiments. Further, he pointed out that the tactical use of armoured fighting vehicles was as yet undetermined and, after all, it was upon this that the medical arrangements would depend in any particular action.

He did not agree with General Downes when he suggested that all the cars should be attached to the headquarters of the squadron. His idea was that it would be better to detach a complete section if necessary.

Regarding the suggestion made about wireless, he would like to point out that such facilities would not be popular

with the fighting troops. He did not think that the fighting services would appreciate the wireless from the ambulances bursting into the air and quite possibly giving away information to the enemy. Finally he acknowledged the great help which he had received in preparing his paper from Lieutenant-Colonel Fisher.

The Problem of Medical Examination.

MAJOR-GENERAL R. M. DOWNES (Melbourne) read a paper on the problem of medical examination. He said that he invited attention to the study of the importance to the community of the problem of medical examination of recruits for military service, including in the term service in the navy and air force, involving as it did decision as to standards of fitness, which was a question of great complexity.

Two objects had to be kept in view at the examination, first the winning of the war, and secondly the cost to the nation in pensions; the problem was to strike the correct balance.

With regard to the cost to the nation, the experience of the last war was well illustrated. Great Britain's armed forces totalled 5,700,000 and America's 4,800,000, while Australia raised a voluntary force of 412,000. In 1936 Great Britain was paying £41,000,000 annually to 450,000 ex-service men and their dependants, and America £100,000,000 to 600,000. In the same year Australia had 76,000 ex-service men pensioners and the annual cost was £7,500,000.

While it was obvious that the greater part of this expenditure was a result of wounds and illness entirely due to war, a not inconsiderable part was due to aggravation of preexisting disabilities. Some of this was so gross that impersonation must have been the loop-hole used in many instances, for example, by men with gross deformities, blindness or loss of an eye *et cetera*.

A reason for mistakes in times of rushes during the last war, possibly due to examination under unfavourable conditions, prompted the statement that a maximum at the rate of fifty examinations per day per examiner should not be exceeded. The importance of suitable, if possible sound-proof, accommodation was stressed.

Passing from the general nature of the question, General Downes considered the individual and the problem he presented. The situation regarding fitness for service in the permanent forces was a special problem, being influenced by the vacancies offering and by the numbers presenting for enlistment. Likewise the position regarding an expeditionary force was also special; there was no call to accept any doubtful man, and there was no excuse for failure to note and record any defect or a potential ground for future pension.

It was medical examination for mobilization that General Downes was primarily considering. When the second volume of the "Medical History of the Australian Army Medical Services" was published the mistakes of the past would be vividly presented. The present was the time to design an "organization for medical examination" that would avoid the pitfalls of the past. The time was opportune to devise the best organization with the human material available and to persuade the administration of the different services that it was of sufficient importance to be accepted. At present there was available a large body of medical practitioners who had had practical experience, but this would not always be the case. With only a non-permanent military medical service, how was an adequate band of examiners to be trained?

Coming to details of the degree of physical fitness required, standards of height, weight and chest measurement differed in the various armies; were they of any consequence? This also applied to the question of dental efficiency, and this matter had been discussed at the recent dental congress in Sydney.

General Downes discussed special examinations in connexion with the diagnosis of early tuberculosis and raised the question as to whether it was necessary to insist on a clear X ray finding. He also asked whether anything

was to be gained by the application of intelligence tests on enlistment. He also asked whether varicocele should be disregarded except in exceptional cases and whether non-descent of the testicle should disqualify an examinee.

General Downes went on to say that defects and deformities of feet constituted a problem of vital importance in the infantry, and yet in no department of medical examination was there more ignorance; very dogmatic instruction would be necessary with the raw examiner.

Examination of the heart presented difficulties. The value of routine exercise tolerance tests was debatable. Albuminuria also took its toll of presumptive recruits. No recruit should be condemned without at least a second or repeated examinations.

COLONEL S. R. BURSTON (Adelaide) said that in any future mobilization for war it would be most essential to have more suitable environments for medical examinations than existed during the early stages of the Great War. It was absolutely essential that medical officers should work in as much comfort as was possible and not be pushed out into the drill shed where there was a considerable amount of noise. He then dealt with certain particular aspects of medical examinations.

As far as the height of the recruit was concerned, he would suggest that the English standard of five feet four inches be adhered to. Weight could be used for the purposes of recording, but not as a guide to fitness or otherwise. As far as teeth were concerned, the present standard of eleven points, he thought, was on the high side, and this could easily be lowered too, but he thought that great care should be taken before this alteration was made. He had been informed by a dental officer that the opinion in a recent congress was that well-fitting dentures were considered to be as useful as a man's original teeth, but that the man with a denture had a very good excuse for dodging unpleasant situations by mislaying his dentures.

Colonel Burston then stated that in principle he favoured an X ray examination of the chest of recruits, but he doubted whether this would be practicable under present conditions. Nevertheless, he suggested that any suspected case could be so examined.

As far as varicocele and undescended testis were concerned, he did not think that the former gave rise to much unfitness during the last war, and he would suggest that this condition should not be regarded as a serious cause of the rejection of the recruit. As far as the latter was concerned, he did not regard this condition as a great bar to medical fitness.

He then dealt with the condition of flat-foot and said that he had arrived at the conclusion that while men with flat feet might be quite efficient in civil life and in the performance of sport and athletics generally, these same individuals broke down when they had to do much marching or standing, as they would have to do under active service conditions. He quoted the case of a very skilled athlete who, on proceeding to England with the Coronation Contingent, found it difficult to keep up with the strenuous training required by the members of that party.

Colonel Burston then dealt with the question of cardiovascular abnormalities, and he suggested that every case should be dealt with on its merits and that no general rule could be laid down. He considered that cardiac efficiency tests often gave an indication of early unfitness, but added that they should be used with discrimination.

COLONEL F. T. BOWERBANK (Wellington) stated that in the examination of recruits in New Zealand albuminuria was not regarded as being very dangerous unless there was definite evidence of kidney disease. He agreed with a former speaker when he said that varicocele should not be regarded as a great disability; it was, however, a definite opportunity for the man who wished to "swing the lead". He thought that the question of dentures was a big one, and he agreed that X ray examination of the chest was desirable, but would probably be impracticable.

Section of Ophthalmology.¹

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Occupational Diseases and Injuries of the Eye and Workers' Compensation.

DR. MARK GARDNER (Melbourne), in his presidential address, discussed occupational diseases of the eye and injuries of the eye. In 666 cases that he had reported to insurance companies during the previous five years there were 32 of conjunctivitis, 10 of conjunctivitis with keratitis, and 6 of acute iritis. Thirty patients had ophthalmia due to exposure to strong light, such as an oxy-acetylene flare or the flash due to electric short circuiting. There were 324 patients with corneal lesions of various kinds, including 230 caused by foreign bodies. Burns occurred in 69 cases, the commonest cause being contact with molten metal; there were various other causes. The severest "burns" had been caused by ammonia, sulphur dioxide and nitric acid. There were perforating wounds in 104 cases; in 50% of these vision had been lost or was inadequate. There were 15 patients with detachment of the retina from various causes. There were rupture of the globe in 12 cases, dislocation of the lens in 9, rupture of the choroid in 4, vitreous hemorrhage in 9 and paralysis in 13. Four patients had simulated blindness after a minor injury and one had deliberately induced conjunctivitis. There were four cases in which optic atrophy had followed fracture of the skull. In Dr. Gardner's experience, about 90% of the patients referred by insurance companies for examination and report were actually suffering from ocular conditions that could be ascribed to the alleged injury incurred or infection acquired during their work. Cases requiring careful consideration were those in which some trauma was said to have occurred and the patient was suffering from interstitial keratitis, an exacerbation of trachoma, or chronic iridocyclitis, and perhaps reacted to the Wassermann test. If injury at a patient's work precipitated interstitial keratitis, for example, the condition had to be ascribed to the injury.

Dr. Gardner discussed the various *Workers' Compensation Acts* of the Australian States, then approached the problem of how an estimation of the percentage loss of vision was to be made. The estimation of the degree of incapacity involved judgement relating the condition of the worker's eyesight with all the circumstances affecting his capacity in his usual occupation and his ability to undertake a new one. Under the Victorian Act it was necessary merely to estimate the percentage loss of vision. At a meeting of the Ophthalmological Section of the Victorian Branch of the British Medical Association it had been decided to regard a reduction of visual acuity to six-twelfths as 10% loss of vision, to six-eighteenths as 25% loss and so on to six-sixtieths as 80% loss of vision. This was not a hard and fast rule, but served as a guide in the assessment of visual incapacity for compensation purposes. If the patient was a skilled worker or a clerical worker, impairment of near vision had to be considered also. Loss of binocular vision was assessed at 50%, apart from the percentage allowed for loss of visual acuity. When visual acuity was diminished in both eyes, two-thirds of the combined percentages were taken as the percentage of vision lost. When the visual fields were contracted or permanent paralyses had occurred, every case was considered on its merits. It had also been decided at the meeting mentioned above that three months should elapse after the last evidence of inflammatory

reaction before the amount of visual incapacity should be estimated.

Dr. Gardner believed that an assessment of 50% loss of vision was not too much when binocular vision had been lost as the result of aphakia following traumatic cataract. No doubt most unskilled workers could carry on satisfactorily with one good eye only; but other things, such as a man's hobbies and recreations, would be interfered with. Having to read with one eye for the rest of his life after having been accustomed to the use of two would surely entitle him to as much compensation as received by a man who, for example, had lost one great toe.

In conclusion, Dr. Gardner said that his aim in writing his paper had been to invite criticism, kind or unkind; he felt sure that many points of interest would be brought out in the discussion on it.

DR. MICHAEL SCHNEIDER (Adelaide) said that compensation in its broad sense resolved itself into the question: "Am I my brother's keeper?" In days gone by this question had implied the answer: "No"; but today it certainly implied the answer: "Yes".

All members of the community were responsible for the workers' welfare and upkeep. The public hospitals no longer carried a sign over the entrance gates: "For the relief of sick paupers." The wage-earner accepted treatment at a public hospital as his right and heritage. In Australia this change in the workman's status had come about by peaceful and not violent methods, by evolution and not by revolution. The workman's rights were accepted and he had legislation to protect him. Compensation acts were periodically revised, and on each occasion something more was added to benefit the workman. His lot was made easier; he was protected against injury and his family was helped should he be rendered unfit for work.

In South Australia as well as in several other States in the Commonwealth a workman was compensated for eye injury only if he should have his earning capacity impaired or lose the eye altogether. This led to unnecessary litigation. Also the injured workman had to arrange for and provide his own hospital and medical treatment, and his sick pay was deducted from any amount which might be paid as compensation.

In consequence he was frequently left with an injury from which he could not recover, which was not due to any fault of his own, which left him with a diminished earning capacity and which might even leave him practically unemployable should he have lost an eye.

Dr. Schneider thought it necessary that compensation acts should include a table assessing loss of visual acuity in percentage equivalents. The following table had been suggested by the Ophthalmological Society of New South Wales; its simplicity was highly commendable.

Corrected Visual Acuity of Affected Eye.	Incapacity (Percentage Equivalent of Total Loss of One Eye).
5/50	85%
5/30	75%
5/25	65%
5/15 = $\frac{1}{3}$ V.	50%
5/12	25%
5/10	10%
5/5	—

¹The meeting of the Section of Ophthalmology with the Section of Neurology and Psychiatry has already been recorded.

The suggestions extended further to include loss of the field of vision, unilateral aphakia, traumatic cataract, detachment of the retina, injury which might be the exciting cause of disease.

A common field for difference of opinion was that of traumatic cataract. In the New South Wales scheme the loss was assessed at 30% to 100% according to the prospect of success. To avoid litigation all traumatic cataracts should be assessed at, say, 70% loss, and should the lens be dislocated or if some other factor present should diminish the chance of successful operation, then the loss should be estimated at, say, 90%. Dr. Schneider thought that this scheme could be adopted with advantage by the other States. It was fair and simple of interpretation.

Another unfortunate feature of most compensation acts was the lack of supervision given to the spending of moneys paid as compensation. When a worker who had never had a credit balance in a bank suddenly received what to him seemed wealth, he was apt to part with it in the most foolish manner imaginable. Any sum over fifty pounds should be paid in weekly amounts of, say, one pound by the Public Trustee, or else the Public Trustee should give his authority before it was invested in some approved business.

Arbitration in compensation cases was an unpleasant way of settling differences of opinion. It arose when medical opinions differed and in no other circumstances.

SIR JAMES BARRETT (Melbourne) said that all Bush Nurses were insured against all accidents and diseases. A great difficulty had always been in deciding the relation between eye injuries and diseases.

DR. C. MORLEY (Perth) mentioned two cases of an acute exacerbation of trachoma following injury; compensation was very difficult to assess in these cases.

DR. C. S. COLVIN (Orange, New South Wales) referred to the great difficulty in deciding the relationship between chaff dust and keratitis. In some cases the keratitis was a superficial punctate variety; in these circumstances no compensation was paid. He mentioned the case of a man who contracted diplopia with a divergent alternating concomitant squint, which followed the bandaging of an eye for six weeks.

DR. A. J. FLYNN (Sydney) drew attention to the great advantage of a scheduled rate for incapacity, and pleaded for a similar schedule for the Commonwealth. He thought that the relation between an acute exacerbation of trachoma and an injury should be on a somewhat similar basis to that of interstitial keratitis and injury. He thought that Dr. Colvin's case was one of a latent squint becoming manifest. He considered that there was no relation between superficial punctate keratitis and injury.

DR. W. L. GIBSON (Brisbane) said that the maximum amount of compensation in Queensland was £500 for the loss of one eye and £750 for the loss of both eyes. In regard to cataracts, he generally gave 75% compensation for the loss of one eye, even if vision was $\frac{1}{12}$ or $\frac{1}{18}$, and this quite independently of the question of a subsequent needling.

DR. BRIAN MOORE (Adelaide) said that compensation in South Australia was far behind that of New South Wales and Victoria; the amount was £280 for the loss of one eye. He thought that 100% compensation should be paid for an aphakic eye.

SIR JAMES BARRETT (Melbourne) asked Dr. Gardner what should be done with patients suffering from traumatic cataract who declined operation.

DR. GARDNER replied that full compensation should be paid.

DR. Z. SCHWARTZ (Melbourne) thought that in the assessing of compensation an attempt should be made to decide the patient's future. He considered that a patient with an acute flare-up of trachoma should receive compensation.

DR. D'ARCY WILLIAMS (Sydney) said that in assessing compensation the relation of the vision of the injured worker to his leisure and hobbies should be considered.

In New South Wales a maximum of £25 was paid for medical attention, and a similar amount for hospital fees. In his State, binocular vision, muscle imbalance, loss of field and the question of improvement with glasses were all taken into consideration.

DR. G. H. BLACK (Adelaide) drew attention to the scheme as tabulated in Behren's text-book, "The Eye and its Diseases". The acuity of vision, the field of vision and the muscle function were reduced to a mathematical formula.

DR. A. L. TOSTEVIN (Adelaide) considered that the acts throughout the Commonwealth should be uniform. He mentioned three cases in which latent squinting became manifest, and the patients were cured by muscle operation and exercise.

DR. BRUCE HAMILTON (Hobart) recommended the formation of a subcommittee of the Federal Council of the British Medical Association to consider compensation for eye injuries.

DR. A. L. DAWKINS (Adelaide) said that a great problem had been how to reemploy the injured worker. The South Australian Railways Department always endeavoured to reemploy the worker after he signed the Infirm Worker's Agreement. In regard to the use of goggles in industry, he had never found that they were responsible for an accident, but, on the contrary, saved many eyes from injury.

DR. A. L. TOSTEVIN (Adelaide) said that in Switzerland, if a man refused to wear his goggles he lost his compensation.

DR. A. F. JOYCE (Victoria) pointed out the difficulty of determining compensation when an injury followed pre-existing disease, for example ulcers on old corneal scarring and injury in high myopes.

DR. GARDNER, in his reply, said that 10% compensation for $\frac{1}{12}$ vision in a manual worker was too high, but should be allowed in the skilled worker. He pointed out that the Victorian act fully covered loss of binocular vision, and also those cases in which an operation for traumatic cataract was refused. He thought that a patient with an aphakic eye should not receive 100% compensation.

In reply to Dr. Colvin, he said that in dealing with the question of an accident causing disease, judgement should be used and, in general, compensation should be given for the acute condition following the injury, but not full compensation for the residual chronic disease which was preexistent. He did not think that such a definite clinical entity as superficial punctate keratitis could be due to injury. He believed that a patient with an aphakic eye should receive at least 50% of the total compensation. He did not think that ophthalmologists should concern themselves with the future of the patient, unless legally obliged to do so. In regard to the use of protective glasses in industry, the great difficulty had been to induce the workmen to wear them.

In reply to Dr. Joyce, DR. GARDNER said that he believed that in many cases it was impossible to get any idea of the preexisting condition of the eye, and such cases would have to be considered on their merits.

The Diagnosis of Tuberculous Disease of the Globe.

DR. J. BRUCE HAMILTON (Hobart) read a paper entitled "The Diagnosis of Tuberculous Disease of the Globe". He said that it was obvious that two urgent questions required answering in ophthalmology, namely: (i) What clinical and biological tests were available for clinching a diagnosis of tuberculous disease of the eyeball when for obvious reasons biopsy was impossible? (ii) What reliance could be placed on each of these tests in arriving at an accurate diagnosis?

DR. HAMILTON and many recent English writers (Goulden, Savin, Sorsby) were of the opinion that tuberculous disease of the globe, both in its direct and allergic manifestations, was much more common than previously supposed, and possibly was as potent a cause of eye disease as focal sepsis.

Possible methods of diagnosis were:

1. Personal, family and environmental histories. These were most important and should be diligently investigated. Positive histories were frequently found in phlyctenular disease, iridocyclitis and retinitis with vitreous haemorrhages (Eales's disease).

2. Clinical signs. Dr. Hamilton said that Garland and Thompson had conclusively proved by biopsy, autopsy and animal inoculation that bilateral painless parotitis with bilateral uveitis with or without facial palsy was tuberculous in origin. Finnoff considered that patients with mutton-fat keratic precipitates, evanescent iris nodules, raised tension, and active choroiditis with vitreous precipitates were also tuberculous, but he had not been able to confirm this with laboratory tests. Cyclitis with heterochromia of the iris was also supposed to be pathognomonic. Conglomerate and miliary tubercles of the fundus were today accepted without question, while retinal perivasculitis with vitreous haemorrhage, areas of old choroiditis with pigmented fringes and equatorial and peripheral choroido-retinitis as found with retinal detachments (Arruga) should be suspected.

3. Skin tests. Both the von Pirquet and the Mantoux were modern routine tests. The former was certainly a most unreliable guide, while the latter only indicated that tuberculous allergy was present. For these and other reasons some prominent ophthalmologists had ceased to place any reliance on skin tests at all.

4. X ray examination of the chest. Wykeham Brooks considered that enlarged hilar glands, resembling those found in Hodgkin's disease, when present with iridocyclitis, were pathognomonic of a tuberculous aetiology of the eye lesion.

5. Sputum. Repeated failures to find tubercle bacilli in the sputum were not sufficient and called for gastric lavage (Ulmar and Ornstein).

6. Blood cultures. Loewenstein's work on this aspect of diagnosis needed confirmation before it could be universally accepted.

7. Blood sedimentation and other blood examinations. A normal sedimentation rate made an active tuberculous lesion very improbable, but otherwise sedimentation rates and other blood examinations should be used only as a guide to prognosis and not for diagnosis.

8. Exclusion of other disease. It was essential that syphilis, glycosuria and obvious focal sepsis should be excluded before a diagnosis of tuberculosis was made, unless the clinical signs were pathognomonic of a tuberculous causation.

9. Results of treatment. Owing to the doubtful value of specific treatment—the use of tuberculin as a therapeutic agent—little weight in diagnosis could be placed on this approach.

10. After-history. It was an undoubted fact that if all patients with ocular inflammation of possible tuberculous aetiology were followed up till death, many would manifest tuberculous lesions in other organs, and some would die of generalized tuberculosis. This appeared an important and almost unexplored avenue of research.

In conclusion, Dr. Hamilton urged the perusal of Wood's and Finnoff's works in order that the important aspect of allergy in tuberculosis might be kept in evidence in making a diagnosis of inflammatory lesions of the eyeball.

DR. J. RINGLAND ANDERSON (Melbourne), in opening the discussion, said that he thought that possibly the difficulty in proving the presence of tuberculosis might be due to the fact that the infection was caused by a bacillus of bovine type. In one case of Eales's disease the physicians had been unable to find any evidence of tuberculosis.

SIR JAMES BARRETT (Melbourne) referred to the experimental work of Williamson-Noble, in injecting tubercle bacilli into the carotid arteries of animals, and the rarity of subsequent tuberculous lesions. He mentioned the rarity of tuberculous diseases of the eye (other than conjunctival granuloma) in sanatorium patients. He stressed the dietary factor in phlyctenular disease.

DR. D'ARCY WILLIAMS (Sydney) referred to the changed attitude towards focal sepsis as an aetiological factor, and

the swing towards tuberculosis. He mentioned one patient with chronic iridocyclitis who had been greatly improved with olive oil injections.

DR. F. J. MILLER (Adelaide) was of the opinion that phlyctenular disease was definitely dependent on insufficient diet.

DR. BRIAN MOORE (Adelaide) considered that phlyctenular disease was allergic in origin.

DR. C. S. COLVIN (Orange, New South Wales) said that the diagnosis of tuberculous disease of the eye seemed to be largely a matter of conjecture. In Vienna, Urbanck had shown him sections of Eales's disease which were typically tuberculous.

DR. G. H. BLACK (Adelaide) referred to three patients with Eales's disease and their improvement with tuberculin. An interesting feature of one of his cases had been the occurrence of the haemorrhages at the menstrual period.

DR. A. J. FLYNN (Sydney) advised caution in deserting focal sepsis in favour of tuberculosis as an aetiological factor. He thought that the diagnosis of tuberculosis was generally put forward as a rather forlorn hope. He referred to a case of iridocyclitis in which the patient subsequently suffered from pulmonary tuberculosis. He referred to one patient with Eales's disease who had been very fully investigated and had been treated with tuberculin. Finally, great improvement followed the treatment of some dental sepsis.

DR. A. F. JOYCE (Melbourne) referred to a case of tuberculosis of the conjunctiva, which was proved by animal inoculation.

DR. W. L. GIBSON (Brisbane) suggested giving patients "Prontosil" before removal of a badly infected tooth, which was causing eye disease.

DR. K. O'DAY (Melbourne) emphasized the importance of taking an accurate history in cases of chronic eye disease which might be regarded as due to tuberculosis. He referred to two cases of Eales's disease in which tuberculosis might reasonably be regarded as the aetiological factor. He also mentioned the extremely careful investigation in Continental clinics of patients suspected of being tuberculous.

DR. MARK GARDNER (Melbourne) referred to the rarity of tuberculous disease of the eye, but considered that possibly with fuller and more accurate investigation more cases might be diagnosed.

DR. BRUCE HAMILTON, in reply, said that Traquair, of Edinburgh, believed it almost criminal to treat phlyctenular disease with tuberculin. He believed that Eales's disease was certainly an allergic manifestation of tuberculosis.

In reply to Dr. Williams, Dr. Hamilton said that every effort should first be made to exclude focal sepsis. He stated that at the Mayo Clinic streptococcal vaccines from the cervix uteri had given extremely good results.

The Retina of the Australian Mammal.

DR. KEVIN O'DAY (Melbourne) read an article dealing with the retina of the Australian mammal. He said that with few exceptions the vertebrate retina was divided into the ten layers familiar to the student of the human retina. There were variations in the relative structures of these layers amongst the different groups and species, and, indeed, amongst the various members of an individual species. Habit as well as taxonomic position determined the structure in each particular instance.

DR. O'Day dealt mainly with the structure of the rods and cones of the Australian monotremes and marsupials. He said that the investigations of Hoffman and Gunn many years previously had revealed oil droplets in the cones of these lower mammals. These findings had not been confirmed, and in recent times doubt had been cast upon them.

DR. O'Day described in some detail the structure of the double cones and twin cones of the lower vertebrates. The twin cones were alike in every detail, whilst the members of the double cone were dissimilar, the chief member con-

taining the oil droplet when this structure was present in the retina. Whilst the presence of oil droplets in the retina of the monotreme and marsupial was referred to in the literature of the comparative anatomy of the retina, the presence of double or twin cones was denied to the mammalian family.

Owing to the kindness of Professor Wood Jones, of the Anatomy Department of the University of Melbourne, suitable material had been placed at Dr. O'Day's disposal for the investigation of this interesting subject. As a result of his preliminary researches Dr. O'Day had been able to report the presence of twin cones with oil droplets in the retina of the marsupial. In the few specimens of fresh retinas which he had been able to examine, the droplets were found to be colourless. This latter finding was at variance with that of Hoffman.

Oil droplets were also found in the platypus as well as double cones. Many of the accessory members contained ectopic nuclei—a rather unusual finding. Cones and rods were present in approximately equal numbers, and the rods were particularly massive.

Dr. O'Day commented on the differences between the retinas of the monotreme and marsupial, the former bearing a much closer resemblance to that of Sauropsida than to that of the marsupial or higher mammal. The twin cone of the marsupial was a curious structure, bearing, as it did, so little resemblance to any of its near relatives.

Dr. O'Day concluded with some remarks on the function of the oil droplets and of the retinal circulation. Many functions had been attributed to the former. One theory gave them a rôle in the function of colour vision. Another, particularly fascinating, regarded them as colour filters to eliminate chromatic aberration and so to sharpen vision. It was worthy of note that whilst they were coloured in the round-pupilled diurnal animal, they were colourless in the slit-pupilled nocturnal animals.

The function of the retinal circulation was another puzzle. That it was not altogether essential for the function of vision was proved by its absence from so many animals with keen vision, in particular the bird.

The paper was illustrated by lantern slides of photomicrographs and drawings of the retina and visual cells of the trout, iguana, pigeon, platypus, spiny ant-eater, native cat, domestic cat, and man, prepared from Dr. O'Day's own material. Microscopic preparations were also demonstrated.

The Future of Ophthalmology in Australia.

DR. J. RINGLAND ANDERSON (Melbourne) read a paper on the future of ophthalmology in Australia. In an endeavour to make sure that ophthalmology in Australia should be developed and kept abreast of the times, he emphasized the need for uniformity in State organizations if cohesion and power were to be obtained. Amongst others, he considered the following aspects of the science and art of ophthalmology: (i) the solution of scientific and ethical problems, (ii) the encouragement of research, (iii) the collection of literature, (iv) the need for a journal devoted to ophthalmology, (v) the advantage of visiting ophthalmologists.

Various methods of fostering these needs were suggested. Amongst these was the formation of an ophthalmic section in each State coordinated by an Australian ophthalmic council, which would work through the Federal Council of the British Medical Association in Australia.

Ocular Diseases in Diabetics.

DR. Z. SCHWARTZ (Melbourne) read a paper entitled "Some Aspects of Ocular Diseases in Diabetics". At the outset he said that it was not his intention to give a detailed list of ocular diseases to which diabetics were specially prone, or to give results of statistical inquiry, but to discuss a few conditions which appeared to him to be of clinical interest and significance. Any oculist attached to a general hospital in the course of a few years had the opportunity to observe the conditions usually occurring, and to observe the course of these conditions, and it was from this aspect that he wished his remarks to be received.

Diabetic retinitis as a clinical entity had been very fully discussed recently by Gray, but there were a few aspects that Dr. Schwartz wished to mention. Diabetic retinitis was divided into the haemorrhagic and exudative types. The typical retinal haemorrhages in these cases were the small round multiple haemorrhages situated in the deeper layers of the retina and some distance from the large retinal vessels, and thus their capillary origin was shown. These haemorrhages lay mostly between the superior and inferior temporal retinal arteries, and lay in the deeper layers of the retina. In addition to these haemorrhages there occurred in some cases the ordinary types of arteriosclerotic haemorrhages, flame-shaped haemorrhages lying along the main vessels, and in yet a smaller percentage of cases there occurred large massive haemorrhages into the retina. In this haemorrhagic type the exudates were few and only gradually increased in amount.

In the exudative type the haemorrhages were few and often absent, but the amount of exudate was large and the exudates continued to increase in size and number.

In diabetics the severity of the disease did not indicate whether diabetic retinitis would develop or not, nor did the amount of sugar in the urine or the rise of blood sugar give any indication whether retinitis would occur or not; and it had been noted in patients who were under treatment on a fairly liberal diet with insulin and whose urine was sugar-free. Nor did treatment of the diabetes have any effect on the course of the retinitis. Once the retinitis occurred it went on irrespective of any treatment.

Though in most cases of retinitis there was coincident arteriosclerosis, still in some cases of diabetes there was arteriosclerosis without the onset of retinitis.

What was the prognosis regarding vision in these cases? The prognosis as to sight was bad in all cases, but there was, so it appeared to Dr. Schwartz, a distinct difference in prognosis in the two types. In the haemorrhagic type the prognosis was dependent on the coincident haemorrhages of the arteriosclerosis, and was worse in the patients with massive haemorrhages; but the prognosis as to sight was worse than in the exudative type. The ensuing loss of vision was more rapid and more complete. The complications such as acute glaucoma in *retinitis proliferans*, with consequent detachment of the retina, occurred, and blindness, practically complete, often ensued, and occurred fairly rapidly, despite all treatment to the diabetes or the coincident arteriosclerosis.

In the exudative type the loss of vision was much slower and less complete, the final loss of vision being due to the formation of secondary cataract. The loss of vision in this type was due to the gradual encroachment of the exudate on the macular area and consequent loss of macular vision. Also complete blindness rarely occurred.

When the cataract occurred in a known case of exudative diabetic retinitis the question arose as to whether it was worth extracting the lens. In Dr. Schwartz's opinion this was well worth doing, as the consequent gain in vision was sufficiently great to be appreciated by the patient, and was often enough for the patient to be able to get about without assistance. In those cases in which he had operated, there did not seem to be any difference in the convalescence after operation as compared with those without diabetic retinitis.

Cataract in diabetics was of three types: the true diabetic cataract, ordinary senile cataract, and secondary cataract.

In operation for removal of cataract in patients with diabetes certain special features occurred on which Dr. Schwartz wished to comment.

It was well known that people with diabetes were more liable to suffer from attacks of iritis than others. This was especially liable to happen after trauma to the iris. Extraction of the lens must, of course, cause some trauma to the iris with consequent liability to iritis. Haemorrhage from the iris occurred very frequently when the iris was cut, as after an iridectomy in diabetics.

These two special liabilities in diabetics had a definite bearing on the type of operation that should be performed when a cataract was extracted.

The combined extraction, which was the operation Dr. Schwartz usually performed, was not suitable in these patients. There was very frequently considerable haemorrhage when the iris was cut, the whole anterior chamber often being filled with blood. This obscured the field of operation, and when the lens had been successfully extracted left a large amount of blood in the anterior chamber.

This set up a marked iritis, with a prolonged convalescence, and very often a dense capsule with the iris bound down to it. This might need several needlings to make an opening in the capsule, and generally the results following operation were not so good as might reasonably be expected.

To overcome this it had been the practice at the Royal Melbourne Hospital as a routine always to do a preliminary iridectomy. This, of course, did not stop the iris from hemorrhaging, but the hemorrhage occurred while the lens was still *in situ*, and, as was well recognized, an anterior chamber full of blood while the lens was present did not cause very great irritation usually, but was quickly absorbed without much trouble to the eye.

This preliminary iridectomy was followed later at a suitable period by the extraction of the lens. This operation was practically bloodless, and the iridectomy having already been performed, was accompanied by very little, if any, trauma to the iris; for this reason it was preferable to a simple extraction with or without a peripheral iridectomy. As in a simple extraction, there was always some trauma to the iris in extracting the lens, with consequently, in many cases, a great deal of iritis with all the ensuing worry and trouble caused both to the surgeon and the patient.

This staging of the operation seemed to give much better results than either a combined or simple extraction.

Diabetics when admitted to hospital prior to operation had always been stabilized on their diet by the physician in charge, and this diet was given to them on their admission. The only difference was that an hour prior to operation they were given 50 grammes of glucose with 20 units of insulin, so as to avoid the risk of acidosis following operation.

DR. M. SCHNEIDER (Adelaide) referred to the difficulties of cataract extraction in diabetics. He reduced blood sugar to approximately normal, and found that haemorrhage was not excessive.

DR. A. L. TOSTEVIN (Adelaide) quoted the view of Himsworth, that diabetic retinitis was a distinct clinical entity. With a high glucose and lower insulin ratio, diabetic retinitis would disappear in younger persons. The prognosis of severe diabetic retinitis in people over fifty years of age was very grave.

DR. ERIC COOPER (Melbourne) wondered whether the diabetic was more liable to develop *retinitis proliferans*. He considered that blood sugar should be stabilized at about 0.12% for some weeks before operation. He had found that the variation in refraction of patients undergoing treatment was a very big problem. He also thought that eye complications were just as frequent since the use of insulin.

DR. C. COLVIN (Orange, New South Wales) favoured a preliminary iridectomy in diabetic cataract.

DR. J. RINGLAND ANDERSON (Melbourne) said that his cases were, as a rule, standardized for two weeks before operation. He operated in one stage, with a final button-hole iridectomy. He remarked on the rarity of retinitis in patients below the age of thirty years, and usually found that the older patients had an associated arteriosclerosis.

DR. J. BRUCE HAMILTON (Hobart) said that the almoner system in the United States of America seemed to have improved the outlook of the diabetic.

DR. MARK GARDNER (Melbourne) referred to one patient with diabetic retinitis, who had been satisfactorily cured, following treatment by a lay physiotherapist.

DR. Z. SCHWARTZ, in reply to DR. Cooper, said that the diabetic was more liable to develop *retinitis proliferans*. He also believed that a preliminary iridectomy was most helpful.

Endocrine Manifestations of Diseases of the Cornea and Conjunctiva.

DR. CLIFFORD COLVIN (Orange, New South Wales) gave the clinical history of six patients, all of whom presented symptoms similar to those of a girl, eighteen years of age, whom he had first seen in January, 1932. She had previously consulted numerous oculists, Dr. Colvin said, but her condition was slowly growing worse. The vision in the right eye was $\frac{1}{10}$ and in the left eye $\frac{1}{12}$ partly. The condition of the right eye suggested sclerosing keratitis with pronounced infiltration of the cornea in the upper two-thirds and with pronounced corneal astigmatism. On the lateral aspect of the conjunctiva was a xanthelasma-like patch. The conjunctiva of the lids was thick, but appeared very smooth peripherally, with small follicles along the upper border. The pupil tended to oscillate. The cornea of the left eye was less sclerosed, but there was a large tumour mass on the limbus in about the two to four o'clock position. It slightly resembled an epithelioma and was soft and vascular, but it was firmly adherent to the conjunctiva and the cornea. A portion had been excised for examination six months previously, and the pathological report made at that time stated that examination of conjunctival smears revealed very many actively dividing squamous cells, many with double nuclei, and two polymorphonuclear cells; there were no eosinophilic cells. Histological examination of the tissue revealed the presence of granulation tissue in which there were numerous inflammatory cells, and of a great number of recently formed lymph vessels; there were no eosinophilic cells. The diagnosis was "inflamed lymphangioma".

Dr. Colvin said that ordinary treatment proved useless. The patient was observed to have a very mild degree of lymphatic oedema in both legs. By way of experiment, Dr. Colvin said, he then gave the patient Burroughs Wellcome mixed gland extract (female). Four months later improvement had taken place; there was less injection and the cornea were brighter and clearer. It could now be seen that there was an old optic neuritis of the right disk; the left disk was normal. The slit lamp showed the opacity to consist of yellowish granules scattered in the substance of the cornea and not extending into Descemet's membrane. The mass at the limbus, Dr. Colvin said, consisted of what he took to be large lymph spaces in conjunctival tissue, with vessels arranged round them and also scattered through the rest of the mass. The vessels extending into the cornea consisted of main branches breaking up into arterioles which formed a loop round a clearer area demarcated in the opacity. In December, 1932, Dr. Colvin said, he saw the patient again; she had had a recurrence of the condition of two weeks' duration. She had ceased her treatment and had been taking a proprietary thyroid gland preparation in order to reduce her weight. The patient was given Oppenheimer's mixed gland tablets, but the condition was worse in March, 1933; she was once more given Burroughs Wellcome's mixed gland tablets, and by August, 1933, the condition was much improved. The patient was last seen in December, 1933; the right eye was very good, and the left eye was only slightly injected, and the growth had disappeared. The patient was advised to continue with the treatment.

Dr. Colvin then shortly spoke of the five other patients who had had somewhat similar conditions, some of them with other complicating factors. He said that a large number of cases of trachoma occurred in western New South Wales, and he was quite certain that the patients he had described had suffered from conditions completely dissociated from this disease, and entirely "spring catarrh", which seldom caused corneal opacity.

Dr. Colvin said that his object in reporting these cases was that they might shed some light on endocrine manifestations in the eye, and that they might aid in furthering investigations on the problem of malignant disease. Moreover, he said, he had had from a government pathologist reports of inoperable malignant growths of the lip, into the substance of which large doses of adrenaline had been given for the purpose of controlling haemorrhage; the growths had decreased, and had disappeared after repeated injections. He had heard from another prac-

titioner that a reduction in malignant disease had followed the intake of tonsillar extract. In conclusion, Dr. Colvin said that he wished to suggest that in certain glandular extracts an unknown factor was present which influenced cell growth. It might well be that failure of this unknown hormone resulted in the production of malignant change in cells.

DR. A. L. TOSTEVIN (Adelaide) said that he had seen three cases similar to those described by Dr. Colvin, which appeared to have remained stationary under treatment with mixed gland products.

DR. J. RINGLAND ANDERSON (Melbourne) referred to the high proportion of spring catarrh in boys and certain points of its resemblance to the condition described by Dr. Colvin.

DR. G. H. B. BLACK (Adelaide) described a case of spring catarrh with thickening gelatinous masses at the limbus, and a horseshoe shaped corneal opacity (not unlike partial *arcus senilis*) with superficial vessels.

DR. KEVIN O'DEA (Melbourne) referred to the relation between the endocrine glands and neoplasms.

DR. D'ARCY WILLIAMS (Sydney) mentioned a case of a boy, aged fifteen years, whose general appearance was strongly suggestive of endocrine dysfunction. His eyelids presented a picture of spring catarrh (not perfectly typical), and with a particularly firm gelatinous mass at the limbus.

DR. Z. SCHWARTZ (Melbourne) referred to the fact that he had seen many patients with myxoedema who showed no corneal diseases.

Dr. Colvin, in reply, said that his cases were proved with reasonable certainty to be not spring catarrh. He suggested the treatment of some patients suffering from spring catarrh with a mixed gland preparation; any improvement in their condition might possibly induce him to reconsider the aetiology of the cases which he had described.

Reactionary Haemorrhage from the Iris.

DR. CLIFFORD COLVIN (Orange, New South Wales) read a paper entitled "Reactionary Haemorrhage from the Iris". He said that the condition was mostly concerned with injuries to the eye resulting from severe, non-penetrating blows, but that it was also found in any injury to the iris, and sometimes followed iridectomy. Dr. Colvin then gave the histories of nineteen patients who had suffered from this condition.

Discussing these cases, Dr. Colvin said that the hyphema was small when the injured eye was first seen, but on the third to the fifth day a severe reactionary or secondary haemorrhage occurred, in spite of absolute and complete rest in bed, without any movement of the head and without predisposing cough or other cause of sudden congestion in the iritic vessels. Some of the patients had been treated with atropine and some without, in the early stages, and secondary haemorrhage had occurred with both types of treatment; this appeared to indicate that the instillation of atropine did not produce the condition. Dr. Colvin said that he was inclined to the belief that possibly a fall in intraocular tension took place, causing the arteries to bleed again; he did not think there was any question of sepsis. The haemorrhage was more severe in those cases in which no dilatation of the pupil was obtained with atropine, and so seemed to develop when the dilator fibres had been ruptured and with them the smaller arterial circle of the iris. Previously, in several cases, operation was performed to relieve the tension, but the results of washing out the anterior chamber were not very successful, the blood being thick and clotted and difficult to dislodge. It had been reported by several medical practitioners that such wounds drained for some time, after which fresh haemorrhage occurred, and a useless eye was often the result.

Dr. Colvin said that his practice was to insist on absolute and complete quiet and stillness of the head, and to give atropine every four hours and ice compresses for half an hour every two hours. Care was necessary in the application of ice compresses, as too much cold might cause sloughing of the cornea in its malnourished condition.

Calcium lactate and calcium gluconate seemed to have little effect in the prevention of haemorrhage. The pain often became very severe, making large doses of morphine necessary. There was often a temptation to operate, in order to relieve the pain; Dr. Colvin thought this procedure unwise.

The occurrence of the secondary haemorrhage, Dr. Colvin said, was usually associated with a feeling of pain in the eye, which had not been present before; fresh blood was seen in the anterior chamber, and could sometimes be observed to be slowly increasing, until it eventually filled the whole of the anterior chamber. The vitreous chamber at the same time was permeated with blood, the eye becoming hard and stony, with pronounced chemosis in the more severe cases. The pain was unusually severe, the patient looked ill, and vomiting occurred. Usually the haemorrhage ceased spontaneously, and in a day or two the pain disappeared; the eye then presented a congested appearance, with the cornea like a "black opal" in the centre. At this stage the vision was reduced to perception of light, and even that might be doubtful. Within two or three weeks the blood in the anterior chamber was slowly absorbed, and the vision improved so that hand movements or movements of the fingers might be distinguished at one foot. The pupil could now be seen, and it was usually found to be unevenly dilated, the tear or rupture in the iris being visible. The patient at this stage was allowed out of bed, and was able to leave hospital shortly afterwards. Dr. Colvin said that if the eye was examined at this stage with the slit lamp, many red blood cells would still be found in the aqueous humour, usually moving in convection currents. In Dr. Colvin's experience, the lens remained translucent; the fundus could not be seen, owing to the opacity of the vitreous humour, which was still full of blood; this, however, was slowly absorbed. The vitreous humour appeared at this stage to be full of "golden spangles", if it was examined under the slit lamp. Absorption of the blood took some months, but progress was faster in children than in adults. The presence of any associated rupture of the choroid, or of retinal haemorrhage that had occurred at the time of the accident, could be determined when the fundus was visible. Dr. Colvin said that he had had no experience of keratome incisions. In conclusion, Dr. Colvin said that he believed the blood-staining of the cornea occurring in two of his cases to be due to a large rupture of Descemet's membrane.

DR. BRUCE HAMILTON (Hobart) said he had no compunction in opening the anterior chamber and washing out the fluid blood. He felt that such treatment was most valuable.

DR. A. L. TOSTEVIN (Adelaide) thought that such cases of complete hyphema were comparatively frequent. He considered that the principal points of a hyphema with hypertension were that there was always haemosiderosis of the cornea, and vision was practically nil. In dealing with this condition in a boy he had opened the anterior chamber, and vision eventually improved to $\frac{1}{12}$. One reactionary haemorrhage appeared to follow the instillation of atropine, and he considered that a mydriatic (or cycloplegic) should not be used. Possibly the atropine had disturbed the ciliary muscle and induced the secondary haemorrhage. He advised waiting four to five days and then opening the anterior chamber. By this time the ruptured vessel had possibly become sealed.

At Moorfields Hospital he found that 7 cubic centimetres of "Hæmoplastin" had been used intravenously in some cases. If it failed the custom was then to open the anterior chamber.

DR. FRANK MILLER (Adelaide) found that in severe cases blood staining of the cornea was always present. In children the staining disappeared, but not in older patients. In one case after the media had cleared there was an extensive rupture of the choroid, and possibly the haemorrhage had occurred from that source. He suggested that the early use of "Hæmoplastin" with any small hyphema following injury might act as a prophylactic as far as secondary haemorrhage was concerned.

DR. M. SCHNEIDER (Adelaide) referred to the case of a boy who had no atropine instillations, and in whom the haemorrhages recurred every few days for about a month.

He thought the loss of vision was not so much due to the secondary glaucoma as to changes in the vitreous. He could see no sound reason for opening the anterior chamber.

DR. BRIAN MOORE (Adelaide) advised investigation into changes in the patient's blood. In one case coagulation and bleeding time were both abnormal. The administration of horse serum had stopped the bleeding.

DR. G. H. B. BLACK (Adelaide) congratulated Dr. Colvin on his good results without any operative treatment. In one of his own cases the haemosiderosis disappeared in eighteen months, but an organizing blood clot formed a membrane across the pupil. He believed in evacuating the fluid blood from the anterior chamber, but did not think that any attempt to remove the clot should be made.

DR. J. RINGLAND ANDERSON (Melbourne) had not met with the more severe cases. He considered there were two outstanding points—the great pain, and the fact that the patients did better without atropine. He advised paracentesis to remove the fluid blood, but advised leaving the clot. In older patients, with haemorrhage following cataract extraction, he usually suspected some thyroid deficiency.

DR. KEVIN O'DEA (Melbourne) referred to a case of severe haemorrhage following preliminary iridectomy for cataract extraction. This cleared up quite well. He thought some factor other than the presence of blood caused the rise in tension.

DR. MARK GARDNER (Melbourne) thanked Dr. Colvin for his interesting and practical papers. His experience was that cases with pronounced blood staining of the cornea did very badly, and the eye often had to be removed. He referred to a case of severe hyphema in an infant associated with melena. In regard to washing out the anterior chamber, he had not had much success as the clot was extremely difficult to move.

Dr. Colvin, in reply, said that the great difficulty about operating was to decide when, and he thought Dr. Tostevin's method of opening the eye on the fifth day was very sound. He was emphatic that the high tension for several days did not seem to destroy the optic nerve as it did with a true primary acute or congestive glaucoma. In regard to the age of the patients, he had not found it of such great prognostic importance.

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President's Address.

DR. GARNET HALLORAN (Sydney), in his presidential address, spoke of the life and career of Sir Morell Mackenzie, whom he described as a "medical visionary". Mackenzie was born in 1837, and became a member of the Royal College of Surgeons in 1858. During his post-graduate studies he made friends with Czermak, who was then using the newly-invented laryngoscope. Mackenzie adopted the instrument, and was one of the first to make popular its use in Britain. In 1863 he was awarded the Jacksonian Prize for his essay on the pathology and treatment of diseases of the larynx, and in the same year he opened a dispensary for the treatment of diseases of the throat, which survived the opposition of opponents of specialism, and in 1876 had one hundred beds and an outpatient attendance of over sixty thousand. He also took an active part in forming various special departments at the London Hospital; and his enthusiasm for specialism as a means of advance in the study and treatment of disease was shown in his writings, which excited much interest. He wrote profusely and well, and left his mark on the present century. He was an excellent teacher, a great organizer, a pioneer in rhino-laryngology, and a surgical specialist of international repute.

Dr. Halloran then discussed the trend toward specialism shown in modern practice. Mackenzie had wondered whether mankind would ever advance so far in the subdivision of labour as to have no doctors at all, but such as were specialists, and whether such a state of affairs would be desirable. Public demand and increasing pressure in the ranks of the general practitioner had created a greater proportion of specialists. In New South Wales the number of ear, nose and throat specialists had quadrupled

during the post-war years, and multiple hospital appointments had become the vogue. Mackenzie's fight had been within the profession. Now the battle was between a greater number of specialists and economic circumstances. What was once given to the poor in public hospitals was now being dispensed to an increasing proportion of the population, and specialists were no longer so willing to shoulder a responsibility which was that of the whole community.

Dr. Halloran then considered the position of the practice of oto-rhino-laryngology in Australia. He thought that the rate of progress had been unsatisfactory chiefly because of the poor quality of the early technical training, and lack of practice in Australian clinics, in comparison with facilities enjoyed in other countries. He suggested that students should have a longer apprenticeship in general surgery, and hoped that throat hospitals would be established in which work of this kind might be controlled and surgical cases treated by a very few, whose technique would thereby be perfected. Chairs in special subjects had been established in foreign universities, and he hoped that in time this might be possible in Australia. He noted with satisfaction that special sections had been formed within both the British Medical Association and the Royal Australasian College of Surgeons, and said in conclusion that the provisions of the *Medical Research Endowment Act* should make possible research work in oto-rhino-laryngology.

Neoplasms of the Larynx.

DR. C. L. ROSEFIELD (Melbourne) discussed neoplasm of the larynx in the light of cases that had been seen at the Alfred Hospital, Melbourne, in the previous ten years. He divided the tumours into two main groups, innocent and malignant.

Of the innocent tumours there were four groups. The first included papillomata. Of these there were six cases. Two were of multiple papillomata occurring in children;

¹ The meetings of the Section of Oto-Rhino-Laryngology with the Section of Radiology and Electrical Therapy and with the Section of Neurology and Psychiatry have already been recorded.

and in four cases the papilloma was single and occurred in adults. One child, aged four years, was cured after the removal of the tumour through the laryngoscope. The other child, aged six years, had been subjected to nine operations, adhesions occurred between the vocal cords and required division, and three and a half years after the last operation a papilloma had to be removed from the ventricle. The four adults were cured by removal of the growth through the laryngoscope. The other three groups of innocent tumours described by Dr. Rosefield were fibromata, angiomatic polypi, and cysts of the larynx. In each of these there was only one case; the three patients were cured.

Dr. Rosefield divided malignant tumours into intrinsic carcinomata, extrinsic carcinomata, mixed intrinsic and extrinsic carcinomata, and chondrosarcomata.

Of the intrinsic carcinomata there were seventeen cases, fifteen occurring in males and two in females. Two of the patients were aged between 40 and 50 years, six were between 50 and 60 years, eight were between 60 and 70 years, and one was over 70 years of age. Four patients were treated by the operation of laryngofissure. Of these, two died from post-operative bronchopneumonia. Of the other two, one was alive eighteen months after operation and the other was readmitted to hospital after operation with increasing dyspnoea, and tracheotomy was required. Five patients were treated by Harmer's operation (fenestration of the thyroid cartilage and insertion of radium). One patient died during the induction of gas anaesthesia, prior to the insertion of radium. One patient had no growth five months after operation; two others were discharged from hospital improved, but not cured. The fifth had been subjected to Harmer's operation on two occasions, with an interval of three and a half years, and two years after the second operation laryngectomy was performed.

Two of the patients with intrinsic carcinoma were treated by laryngectomy. One was alive fifteen months after operation and was to be fitted with an artificial larynx. The other died one month after operation.

One patient was treated by the external application of radium, without improvement. Two patients were treated by deep X ray therapy with some improvement, but without cure. The remaining four patients had inoperable growths or refused operation.

Twenty-six patients, all males, suffered from extrinsic carcinoma. One patient was aged between 40 and 50 years, five were between 50 and 60 years, 12 were between 60 and 70 years, and eight were over 70 years of age.

Three were treated by Trotter's operation of lateral pharyngectomy. All were dead. Two died two weeks after operation of respiratory infections, and one eighteen months after first being operated on.

One of the patients with extrinsic carcinoma was treated by Harmer's operation and died a month later. Two were treated by the external application of radium, without improvement. One was treated by the direct implantation of radium into the growth in the pyriform fossa, without improvement. Ten were treated by deep X ray therapy; five showed some improvement, while the other five either failed to improve or became worse under treatment. One was treated by lead without improvement, and in the remaining eight cases the growths were too advanced either for operation or irradiation.

There were ten cases of post-cricoid carcinoma, five occurring in females and five in males. One patient was aged 38 years, three were between 50 and 60 years, two were between 60 and 70 years, and four were over seventy years of age. One patient was treated by the implantation of radium, without improvement. Four patients were treated by deep X ray therapy; one showed glandular involvement four months later, two died four months after treatment and there was no record of the fourth. One patient was treated with lead, without improvement, and in four cases no special treatment was given.

Dr. Rosefield then discussed the mixed intrinsic and extrinsic carcinoma. Of this there were six cases, all occurring in males. Two patients were aged between 50 and 60 years, three between 60 and 70 years, and one was over 70 years of age. Three were treated with lead, without improvement. One was treated by deep X ray therapy

and died a month after treatment. One died soon after admission to hospital and one refused laryngectomy.

One patient suffered from chondrosarcoma. He was 32 years of age. The growth was removed by laryngectomy and radium was subsequently applied. Improvement occurred for a time, but some months later the patient died.

Dr. ADRIAN FARMER (Perth) said that he wished to thank Dr. Rosefield for the excellent summary of the work that had been done on the subject at such an important clinic as the Alfred Hospital. He was hoping that Dr. Rosefield would conclude his paper by stating that at last he had reached some standardization of the treatment of cancer of the larynx. He would later on give his own opinion regarding standardization, which had lately been formed after experience for ten years of the very varied methods employed at the Perth Hospital clinics and in private practice.

With regard to non-malignant tumours of the larynx, Dr. Farmer agreed with Dr. Rosefield that, excluding tuberculous lesions and papillomata, they were very rare and the only two cases he had seen had both been syphilitic. One tumour was a gumma in the false cord and the other an atypical ulcer on the vocal process, both of which rapidly responded to appropriate treatment.

Discussing the aetiology of malignant growths, Dr. Farmer said that he thought they must all have been impressed by the association of dental sepsis with cancer of the larynx, both intrinsic and extrinsic, as well as with the tongue and the floor of the mouth; and he was convinced that dental sepsis was the most important contributing factor. In his own cases the absence of a positive response to the Wassermann test had been surprising, particularly amongst the hospital class of patient. With regard to the pathology, they must agree that practically all carcinomata of the larynx were epitheliomata. But they ought to go further and ask the pathologist what degree of differentiation was taking place. This was a confirmation of Sir St. Clair Thompson's early teaching. If there were no tendency to differentiation, then it was known that there would be a tendency to a late formation of metastases and that the growths were radiosensitive and would respond well to either surgery or deep X ray therapy.

Intrinsic lesions were usually non-differentiating, but extrinsic lesions tended to spread rapidly, both by continuity and by the lymphatics. Particularly did this apply to lesions in the glotto-epiglottic fossa and post-cricoid region. Growths in the pyriform fossa seemed to occupy a midway position. Here Dr. Farmer related the history of a male patient, aged fifty-eight years, who had a lesion involving the left arytenoid cartilage with spread into the pyriform fossa. The primary lesion responded to deep X ray therapy with complete healing in two months. Fourteen months later the patient returned with a hard gland in the left supraclavicular fossa which again disappeared like magic under treatment. Fifteen months later he returned complaining of bilateral sciatica, and an X ray examination of his pelvis revealed multiple secondary deposits throughout both ilia. Although his condition was considered hopeless, the patient was given treatment and even these lesions completely cleared. Now a year later this patient was quite well and earning his living as a labourer in the country.

In discussing the treatment of cancer of the larynx, Dr. Farmer said that he had treated intrinsic lesions by (a) the pallisade method of Harmer, (b) deep X ray therapy and (c) excision by laryngofissure.

The pallisade method, although leading to rapid disappearance of the lesion, had been disappointing and early recurrences had occurred. Dr. Farmer infinitely preferred deep X ray therapy to this method, and he was certain in his own mind that the safest way of treating such cases was by surgical removal followed by a covering surface dosage of deep X ray therapy to 2,500 r. He had had experience of six cases of his own with two deaths. These deaths were those of the first two patients upon whom he had operated and both died a fortnight after the operation when apparently doing well; one died from heart failure secondary to auricular fibrillation which developed during convalescence and the other collapsed suddenly

also apparently from cardiac cause. This had made him careful in his choice of case and particularly in the preliminary preparation.

There was no need to hurry, as these epitheliomata were usually non-differentiating; the patient's condition should therefore be investigated and he should be built up while the investigation was going on. Dental sepsis should first be eradicated; a test should be made and a blood count carried out, and the cardiac and renal function should be investigated. This could take from four to five weeks to enable the effect of the removal of the dental sepsis to subside. The biopsy should be taken a week before so as to lessen the risk of hastening the formation of metastases.

Regarding the operation, he much preferred a local anaesthetic which was wholly satisfactory and removal of the tumour with the endotherm knife. This latter, however, did cause more local reaction and sepsis within the larynx usually necessitated the use of a tracheotomy tube and its retention sometimes for two to three days. Otherwise, he faithfully followed the instructions of Colledge and entirely agreed with him concerning the inadvisability of giving narcotics. None of his six patients had suffered from bronchopneumonia.

Dr. Farmer favoured deep X ray therapy rather than laryngectomy, as he felt that the non-differentiating tumour would respond to therapy and give as good a result as a mutilating laryngectomy. If sepsis was super-added to the malignant lesion or if it was a differentiating epithelioma then the patient would not do well with therapy, nor did he consider that he was likely to do well after surgical removal, with its long, tedious and worrying convalescence. Again these lesions had begun to form metastases and therapy could be applied to the glandular areas at the same time as the primary lesion was being treated. The possible exception occurred in the healthy middle-aged man with a bilateral intrinsic lesion.

The method used in Perth of applying deep X ray therapy had been a simple modification of the Coutard technique. The surface dosage had been approximately 150 r every day, Sunday excepted, to each side of the neck extending over a period of three weeks. This gave a total surface dosage of just over 3,000 r and appeared to be the average limit of tolerance. The reaction about the beginning of the third week had definitely been a worry in this situation and particularly in post-cricoid lesions. By this Dr. Farmer meant the local internal reaction with oedema of the glottis and toxæmia, and not so much the skin reaction which was of lesser importance. Fulton, of Glasgow, in *The British Journal of Laryngology* of June, 1937, had stated that his best results with deep X ray therapy had been when protracted dosage of low intensity was used. This meant six hours per day or even longer and greatly diminished both local and skin reactions. The great problem, however, was the administrative difficulty of placing a machine at the disposal of a single patient for this length of time, especially in crowded public hospital clinics.

Dr. Farmer summarized the method of procedure in treating malignant disease of the larynx, which at the present time, in his opinion, gave the best results, as follows:

1. Very careful investigation of the patient's general condition and exclusion of other disease.
2. Eradication of sepsis with an interval of four to five weeks.
3. Biopsy as late as possible before commencing active treatment.
4. For intrinsic lesions, surgical removal by laryngofissure, followed by a cover of deep X ray therapy as soon as the patient's condition permitted.
5. Deep X ray therapy for extrinsic lesions.

Dr. MILTON COURTS (Sydney) confined his remarks to malignant neoplasms. Discussing the question of diagnosis, he said that indirect laryngoscopy usually afforded the first view of the larynx, but in many cases the anterior third of the glottis, which was the most important part, was difficult to see. A small subglottic neoplasm could be missed, even though it was large enough to produce

huskiness of the voice. Direct laryngoscopy under local anaesthesia was usually quite simple, especially if a bronchoscopic headrest was used. In the anatomically difficult patient it might be necessary to give a general anaesthetic, but this should be no bar to the procedure. Biopsy by direct laryngoscopy was easy and should always be undertaken. When the tumour was examined by direct vision it nearly always appeared larger and quite different from that seen in the mirror.

Blegvad had reported a case in which, by the operation of laryngofissure, he had removed the vocal cord for supposed carcinoma. The condition proved to be tuberculous infection and the result was rapid spread and death.

X ray diagnosis had been investigated by Pack and Craver and others. Benign tumours appeared homogeneous, had a clear-cut outline and no infiltration was present. In order to be visible, the carcinoma had to be more than one centimetre in diameter; it then produced an irregular shadow. The extent of a subglottic tumour could be more accurately judged with an X ray examination than by direct laryngoscopy. The aim of treatment should be eradication with a minimum of mutilation.

For intrinsic cancer the aim should be laryngofissure, because the cosmetic effect was satisfactory and the moral effect on the patient was good. He could commence to talk in the first week after the operation and could look forward to a useful life. When the cord was fixed, the choice lay between laryngofissure, hemilaryngectomy and laryngectomy. In the determination of which of these operations should be performed, Broders's grading was of great assistance if sufficient tissue could be obtained at biopsy. If the tumour fell into Class I, "the highly differentiated type", in which there was a recurrence rate of 6%, it was better to proceed with laryngofissure and possibly hemilaryngectomy and to follow this up with deep X ray therapy. If, on the other hand, the tumour fell into Class IV, "the undifferentiated group", in which a recurrence rate of 72% was reported, laryngectomy was obviously a most suitable procedure.

The patient with extrinsic cancer was rarely seen early enough to justify the undertaking of conservative surgery, though lateral pharyngotomy for post-cricoid carcinoma had shown good results in skilled hands. It was poor solace to a patient with a tumour of the epiglottis to have to live without a larynx or a tongue.

It was hoped that deep X ray therapy might yet obviate much mutilating surgery, which, though it saved lives, frequently destroyed the individual from the psychic point of view.

Dr. H. M. JAY (Adelaide) was interested in the remarks of Dr. Coutts in quoting Dr. Blegvad, of Copenhagen, who had removed a tuberculous lesion of the larynx in mistake for carcinoma. He had himself done the same thing. In his opinion, Harmer's procedure was not of much value, considering that laryngofissure was available as a more effective form of cure. He mentioned a case of carcinoma at the base of the tongue which was large and fungating, and of which he had destroyed as much as possible by diathermy. Three years later the patient had no sign of the lesion, but had a gland under the angle of the jaw for which he refused treatment. Dr. Jay said that it was difficult to get Broders's classification of tumours done in Adelaide. With regard to oral sepsis, most of the patients who presented themselves with laryngeal tumours were fifty and over, and they all had some form of sepsis, pyorrhœa or decay.

With regard to laryngectomy, he submitted one patient for X ray instead of laryngectomy; the result was bad. He then proceeded and did laryngectomy, and the result was even worse, because the tissues would not heal. In another case of laryngectomy in which he had to tie the jugular vein, the patient developed paralysis on one side of the body three days after operation. He wondered if this could in any way be due to the tying of the vein. He had two cases of post-cricoid carcinoma in which he did lateral pharyngotomy. In one case the condition cleared up, but the other patient died within forty-eight hours of leaving hospital, though with a perfectly healed lesion.

DR. HUFF JOHNSTON (Sydney) mentioned the difficulty of differentiation of early malignant disease of the larynx from keratosis of the larynx. In one case the lesion looked like a double carcinoma of the cords, but there was thick epithelium about the hands and face which suggested that biopsy should be done. In another case of a similar nature biopsy verified the diagnosis of keratosis. With regard to laryngofissure, he had, on one occasion, experienced severe bleeding with the necessity of plugging the larynx for some time. He thought that on a future occasion when he experienced bleeding he would apply to the bleeding surface "Styphen", which he had found useful in hemorrhage from the tonsil fossa. He had had one patient with eight months' hoarseness whose right cord was fixed and whose left cord was almost fixed. X ray examination of the chest showed no abnormality. Nine months later the left cord became fixed, necessitating urgent tracheotomy. Eighteen months later the patient's condition was very much improved, and there was no evidence of tumour in the larynx. The patient was submitted to deep X ray therapy, after which complete resolution appeared to occur and the tracheotomy tube was removed.

DR. E. W. GUTTERIDGE (Melbourne) did not agree with the adverse criticism of Harmer's method of radium implantation. In his experience good results had been achieved by it in selected cases. His method was to carry out complete removal of the thyroid cartilage, if necessary on both sides. He had inserted thirteen or fourteen one-milligramme needles for one week in both sides of the larynx of an elderly lady three years previously. She was still apparently cured, and could speak, despite a structural deficiency of her larynx.

DR. C. SANGSTER (Adelaide) had formed the conclusion that treatment in carcinoma of the larynx was not hopeful with deep X ray therapy, the local results were not good and the patient had a severe time. He would like to know how soon after laryngofissure deep X ray therapy should be employed, on account of the granulations and swelling which remained after operation.

DR. R. M. GLYNN (Adelaide) quoted a summary from the report of the Adelaide Hospital of thirty-one cases of intrinsic cancer of the larynx. Three laryngectomies were performed and one patient was alive fifteen months afterwards, two were dead, one of cerebral haemorrhage and the other after treatment by X rays. Four laryngofissures had been performed; of the patients three were alive five, four and three years afterwards, and one was dead. Six refused treatment, and eighteen patients were treated by deep X ray therapy and radium. Of these, fifteen were dead, and in the others the condition was of recent origin. Dr. Glynn favoured operation when possible.

DR. C. L. Rosefield, in reply to Dr. Farmer, said that some authorities did not advise very thorough clearing up of sepsis before operation, as there appeared to be no injurious effects in cases of laryngofissure if sepsis was present in the mouth. The reaction to deep X rays was not so severe in his experience as in that of others. Probably it was more marked in extrinsic than in intrinsic tumours.

In reply to Dr. Gutteridge, Dr. Rosefield said that he thought that his radium dosage was high. In the opinion of some authorities, seven to eight milligrammes for one week was too much.

Prophylaxis of Antral Infections.

DR. A. E. BROWN (Adelaide) began his paper on the prophylaxis of antral infections by referring to an address on the treatment of antral disease delivered by Mr. O'Malley at the 103rd annual meeting of the British Medical Association in Melbourne in September, 1935. In that paper, Mr. O'Malley had stressed the importance of aiming at complete restoration of function in all treatment. Dr. Brown, in his paper, asked those present to view this problem from another angle, namely, the prevention of antral disease and its sequelae.

There was no doubt that complete protection from colds was the best preventive. But when a patient was brought

to them already suffering from frequent colds in the head and sore throat, what were they to do?

Dr. Brown was emphatic that every patient suffering from repeated colds in the head or nasal obstruction was a potential sufferer from antral disease, and while an endeavour was made to remedy the immediate condition, the ultimate aim should be the prevention of later sinus infection. If the condition did not readily respond to conservative treatment, then it was necessary to remove any unhealthy tonsils and adenoids which might be present.

At this point Dr. Brown stated that should the tonsils be healthy and small they might be left alone with safety, but there should be no hesitation about the removal of the post-nasal growth. This must be thoroughly and completely removed.

At operation it should not be beneath the surgeon's dignity to examine the post-nasal space by palpation and illumination in order to be quite certain that no adenoid tissue was left behind.

In practically every patient on whom Dr. Brown had had to do an antrostomy following operation for removal of tonsils and adenoids he had found masses (large or small) of adenoid tissue which had been overlooked. The tonsils might have been dissected out perfectly. But the adenoids—the more important factor in clearing up nasal discharge—had in part or whole been left behind. It seemed to Dr. Brown to be quite impossible to clear up any nasal discharge until perfect drainage and ventilation in the nares had been established. Indeed, to his mind, the all-important consideration was ventilation in the nose and posterior nares.

Should the nasal cavities be blocked by enlarged turbinates, a portion of the anterior end of the middle turbinates should be removed in order to ventilate the nose more completely. This could be best done, he found, by using Ballinger's biting forceps under focal illumination; if the inferior turbinates were congested they might be lightly cauterized with trichloroacetic acid.

In adult patients a submucous resection should be performed whenever septal deviation caused nasal blocking. As soon as possible after this operation the patient should be taught to breathe through his nose. Dr. Brown regarded correct breathing exercises as of the very greatest importance. It was quite amazing to see the rapid mental and physical improvement in the patient after a few weeks' instruction in correct nasal breathing.

Diet was another very important factor, as Price had shown at the congress in 1934, when he emphasized the advantages of a diet of wholemeal bread, butter, sprouted legumes, fresh raw carrot and cabbage, as well as fresh unboiled whole milk and plenty of water and orange juice. Personally, Dr. Brown had found this type of diet of the greatest use in reducing liability to nasal infection. Sweets and carbohydrates should, of course, be strictly limited.

There was no doubt that regular exercise in the open air was one of the most important preventives of infection.

Should the nasal discharge still persist, a change of residence to high altitudes with plenty of vitamin D would frequently prove completely effective. At present, in Adelaide, they were sending patients with mild antral infection to Mount Lofty Convalescent Home after having carefully removed the adenoids and treated the inside of the nose.

Recently, short wave diathermy, ionization and ultraviolet light had been much used. The Duke-Fingard treatment also had proved effective; but the cost of its application at present appeared to be prohibitive.

Patients suffering from hyperesthetic rhinitis should immediately, on diagnosis being made, be subjected to sensitization tests and be given the necessary treatment. Ephedrin and "Neo-salvol" drops in the nose were another form of treatment which had proved fairly successful in checking the congestion of the nasal mucous membranes.

Antral disease due to infection from septic teeth should never be allowed to occur. To prevent this they should advise and insist upon frequent dental inspection.

Should a patient develop an acute rhinitis, rest in bed was essential. Diaphoretics (aspirin or Dover's powder

internally) and inhalations of menthol and compound tincture of benzoin should be given to relieve pain and congestion of the nasal mucous membranes and to hasten resolution. Later, a spray of 5% argyrol three or four times during the day or a nasal pack once a day of 25% argyrol in glycerine would hasten recovery; or the Proetz method might be given a trial.

Should the antra become infected, inhalations should be continued, and if free discharge was present, douching once or twice daily with warm bicarbonate of soda solution was very grateful to the patient. This, along with a change to a warm dry climate with plenty of cod-liver oil and malt, was usually sufficient to check any further nasal trouble. If, however, in spite of this the infection was not becoming less, it would be necessary to puncture and wash out the antra. This operation might be repeated on several occasions, but should not be persisted in for too long a time. In children it was wiser to do a simple antrostomy with a thorough removal of the nasal wall below the attachment of the inferior turbinate so that a permanent free opening remained. In this way the disease was checked and the danger of its becoming chronic was removed.

After antrostomy had been done, Dr. Brown found a few injections of coryza vaccines of the greatest help in clearing the discharge and building up the patient's resistance against further infections. Vaccines, before free drainage had been established, had, in his experience, proved quite useless.

Dr. Brown summed up his remarks by saying that the chief hope in trying to check the spread of nasal infection and antral disease lay in the prescribing of a suitable diet, correct nasal breathing and, above all, thorough ventilation of the nose.

DR. R. HENNESSY (Melbourne) found that the principles of the whole mechanism of antral infection depended on two or three factors, the chief of which was dependent on the correct movement of the cilia in washing away the mucus which of itself was another factor in the defence mechanism. The first step in the breakdown of the normal healthy mucosa was that something went wrong with the cilia. He did not concentrate his thoughts on the antrum. He thought that the question involved the whole Schneiderian membrane of the nose and, in fact, the whole respiratory mechanism, and why should the antrum be singled out for special mention? He thought that a big factor in the breaking down of the normal healthy state of the nasal mucosa was lack of ventilation and, secondly, the teeth might be responsible in a measure. Little children with well-established antral disease invariably had bronchial disease, but in Dr. Hennessy's opinion the nasal disease did not cause the disease in the lung nor did that in the lung produce a similar infection in the nasal mucosa. He thought that in children of five or six possibly the whole ciliated mucosa had broken down. Was this due to some fundamental constitutional fault? He also thought that social conditions were a big factor in producing the increased incidence of nasal sinus infection—the herding together, the dust and the atmospheric pollution of cities. He believed it to be a constitutional disease in which respiratory epithelium broke down. In his opinion, in respiratory infections the soil was everything, the infection nothing. Once the machinery was broken down gross infection occurred, as, for example, rheumatism and its breaking down of the synovial membranes. Antral infection was probably due to defective drainage.

Dr. Hennessy had suspected for a long time that early extirpation of the tonsils and adenoids of children under five predisposed them to antral infection. He had seen little children after tonsillectomy and adenectomy return with beginning antral infection at the age of six and seven. It was possible that very thorough extirpation helped to destroy this mechanism of defence. Dr. Hennessy removed adenoids less frequently nowadays than he had done in the past and performed the operation only when there was very definite indication. He thought that the adenoid tissue was better left than removed. In regard to little children aged seven with presumed antral infection, he

thought it most important that the action of the cilia should be restored. He laid utmost stress on antral lavage. It was his custom to puncture and wash the antra of children aged from four years onwards, using local anaesthesia. In fact, he thought that younger children were more amenable to this form of treatment than older children of, say, fifteen. He washed the antra usually twice a week and might do it as many as fifteen or twenty times. He also gave vaccine as an important part of his treatment. In his opinion, antrostomy did more harm than good.

DR. CLIVE EADIE (Melbourne) divided infections into two classes, (a) that found in children and (b) that found in adults. With regard to children, he thought that nasal sinus infection had a great deal to do with the constitutional factor and it was important to establish free ventilation. With regard to tonsillectomy and adenectomy, if there was a large adenoid preventing ventilation, it should be removed, but it should not be removed so thoroughly as to leave scarring. When tonsils were large, he had no hesitation in removing them. It was not necessary always to remove both the tonsils and the adenoids. He thought it sufficient to remove only the one or the other which appeared to be causing disease; the nasal passages of children, being so small, were difficult to deal with. He agreed with Dr. Brown that the middle turbinate should be removed and that intranasal antrostomy should be done either through the inferior meatus or the middle meatus. He found difficulty in getting the children brought back for further washouts under local anaesthesia either because of the objection of the parents or the difficulty of handling the child. He did not wash out antra too frequently, as some of the solution must surely be left in the antrum. He thought once a week adequate. In adults he thought that acute antritis was usually associated with acute coryza or influenzal infections and that usually a few washouts cleared up the infection. He preferred to drain the antrum through the middle meatus, but it was not always necessary to perform antrostomy. In many cases reduction of the turbinates was necessary and also submucous resection of the septum. He felt that if the anterior end of the nose was obstructed with swollen mucous membrane the posterior end would be similarly obstructed and required some form of treatment.

DR. E. A. MATISON (Adelaide) thought that the most important treatment in antral disease was the establishment of proper ventilation of the nose, and he agreed that in children it was necessary to treat the septum with respect. It was his custom when an antrum did not improve after antrostomy to perform the radical operation; he preferred the Caldwell-Luc as being the better form of operation, allowing better access for more complete extirpation of the lining.

DR. C. L. ROSEFIELD (Melbourne) thought that the question of allergy had to be considered in antral diseases. In his experience antral disease in London was a very definite thing, being always associated with obvious purulent secretion, whereas in Melbourne it was associated frequently with gross hypertrophy of the mucous membrane, but with very little pus in the washout. It was his experience in Melbourne that on a north-wind day the mucosa of the nose of patients examined was frequently swollen and nasal obstruction was common, whereas on other days the swelling was not so pronounced. It was his custom to do repeated washouts when pus was present.

DR. GARNET HALLOAN (Sydney) stressed the importance of repeated allergic attacks in sinusitis. He had had repeated X ray examinations made on the same children and noted that during the allergic periods the antral mucosa was so swollen as almost to fill the antrum, and at subsequent examination it would be found within normal limits. He thought that the title "radical antrostomy" did not describe the operation generally performed and he would be happy to see a word take its place which would more adequately describe the operative procedure.

DR. BROWN, in reply, said that he thought that Dr. Hennessy's suggestion of a common factor in nasal sinus disease was of great value. He thought that there was

some factor in Australia which caused nasal sinus infection to be more prevalent than in the Old Country. Dr. Eadie had pointed out that scarring after removal of adenoids might be an avenue of infection. He felt that when there was a swollen adenoid it must impair the ventilation and hold up infection and was, therefore, better removed. He also thought that the removal of portion of a large middle turbinate was a very important factor in increasing ventilation. With regard to repeated antral washouts in children, it was his experience that parents disliked bringing their children back for rewashing until the nose was clear. They came for a time, but in his experience the parents became more nervous than the children, with the result that the infection was never completely eradicated and the child would drift into a state in which antrostomy was no longer an effective form of treatment. It was his custom after antrostomy in children to keep the child under the influence of various sedatives. Bromide and chloral were given three times a day during the course of a post-operative antral lavage. The child appeared to lose its nervousness and to submit to the washouts with lessening apprehension. He thought that the washouts should not be commenced until three days after operation and that reasonable space should be left between the washouts. He thought that washouts could be done too frequently. He thanked Dr. Rosefield for mentioning allergy and he felt that there was a definite atmospheric condition as well as pollens and foods, which was a factor in producing antral disease in children.

Physical Therapy in Oto-Laryngology.

DR. ERIC GUTTERIDGE (Melbourne) read a paper on physical therapy in oto-laryngology. He said that Hertzian short wave diathermy of high wattage (500) produced deep and selective heating of the deeper tissues rather than of the skin and subcutaneous structures. The sustained active hyperemia with its increased oxygenative and phagocytic powers increased the local defensive mechanism and relieved pain. Air-spaced electrodes were preferred, with rubber condenser electrodes in deep-seated conditions, such as acute and chronic catarrhal chest conditions.

Infra-red radiations caused active local hyperemia to a considerable depth of the tissues. There was increased hyperemia—the rise in temperature speeded up the protective agencies. Chemical reactions were increased. Ferments acted more efficiently. More white cells arrived, and they were more actively phagocytic.

Ultra-violet irradiation by the carbon arc lamp and the air-cooled quartz mercury lamp had a small penetration of the skin or mucous membrane. The action was local, from erythema to vaso-dilatation and blistering (as in sunburn). Tissue stimulation, germicidal and cytolytic effects were produced. General ultra-violet irradiation increased the calcium and phosphorus content of the blood, its haemoglobin and erythrocytes, and increased the bodily resistance toward infection. These agents were valuable ancillary measures in certain diseases of the nose, larynx and ears.

The common cold was frequently aborted by the application of ultra-violet light with a quartz pencil to the nasal cavities. A daily treatment by the infra-red lamp mobilized the defences and diminished the congestion in the stage of microbial secondary infection. It stimulated the mucosa and hastened resolution. Short wave diathermy with a rubber condenser electrode applied to the front of the chest relieved the tracheitis following downward spread of the coryza.

As an ancillary measure in acute sinusitis, when the sinus had been washed out and other measures to increase drainage had been taken, infra-red radiation was invaluable—congestion was diminished and pain was lessened. Short wave diathermy was indicated at a later stage with an air-spaced electrode upon the frontal or maxillary region and a second electrode behind the head.

Discussing chronic sinusitis in children, Dr. Gutteridge said that when the usual methods of removal of tonsils and adenoids, when diet, hygiene and intranasal drainage of the antra had not succeeded in restoring the mucosa to

normal, short wave diathermy was helpful. It would rapidly clear up the coryzal reinfections of the damaged mucosa.

Catarrhal sinusitis with little radiological evidence of thickened mucosa but with a muco-purulent nasal and post-nasal discharge was greatly benefited by short wave diathermy, combined with the usual measures to obtain drainage and ventilation of the sinuses (septal resection, turbinectomy, menthol-ephedrin sprays *et cetera*). Diathermy produced a direct action on the mucosa and submucosa of the sinuses, a hyperemia and increased phagocytosis. Treatment for ten minutes by air-spaced electrodes every second or third day for eight sessions was required, and might be supplemented by a similar period of exposure to the infra-red lamp. Ten patients suffering from infections of this type had reported considerable improvement with cessation of the nasal discharge.

Hollender stated that in chronic sinusitis, particularly after conservative drainage of the sinuses, short wave therapy was useful. One case with minor radiological shadows in the antra and with a comparatively short history had, in Dr. Gutteridge's experience, completely cleared up under this treatment. Two other patients with fibrosis of the antral mucosa received no benefit and required removal of the mucosa. A patient with low grade infection of the frontal mucosa accompanied by headache and a blind spot had been relieved by ten treatments with short wave diathermy.

No patients with polypoid degeneration of the sinus mucosa had been treated. Allergic rhinitis, with or without secondary bacterial infection, had been treated by zinc ionization (Hollender). An infiltration with lymphocytes ensued, progressing to subepithelial fibrosis with destruction of the ciliated epithelium and a metamorphosis to stratified squamous cells. The cilia never regenerated (Hollender) and thus the important ciliary drainage mechanism was for ever lost.

Acute myringitis and acute otitis were benefited by infra-red rays in association with the usual surgical measures. There was a most valuable deep heating effect replacing the plastine and hot water bottle, and a most effective analgesic action took place.

In chronic *otitis media* zinc ionization was useful in cases with a large perforation and no evidence of bone necrosis. In the radical mastoid cavity, when the thin epithelial lining had been partially destroyed by accumulation of débris or cerumen, zinc ionization was helpful.

The ultra-violet lamp with a curved quartz applicator was used in laryngeal tuberculosis to produce an erythema with subepithelial fibrosis. It was sometimes palliative and curative in the presence of stationary or healing pulmonary lesions. General ultra-violet irradiation in non-febrile cases of laryngeal or pulmonary tuberculosis was helpful in building up the general body resistance.

In conclusion, Dr. Gutteridge stated that physical therapy by short wave diathermy, infra-red and ultra-violet phototherapy, and zinc ionization was useful as an addition to the recognized forms of topical and surgical treatment. Short wave diathermy and phototherapy facilitated a direct attack upon the nasal mucosa and submucosa, leading to regeneration when the infection was of minor degree.

DR. C. L. ROSEFIELD (Melbourne) said that he was in England when Dr. MacKenzie was enthusiastic about diathermy and its application to chronic tubal catarrh, from which he himself suffered. Dr. MacKenzie placed one electrode on the mastoid and the other on the opposite cheek; it was very important to get the electrodes parallel, otherwise burning was apt to occur at the point of great concentration of the heat. The results were very unconvincing, although he did think that tinnitus was diminished in some cases.

DR. M. COURRS (Sydney) said that he had tried diathermy of the old type for tubal catarrh and its associated deafness, and found that there was usually some improvement in the hearing after the first treatment, but subsequent treatments appeared to produce little or no improvement. He was most interested in the treatment of antral infections, especially in children, by infra-red rays and short wave therapy. In his experience antrostomy in children

was frequently unsatisfactory because of the early closure of the antrostomy opening, which was principally due to scarring of the soft tissues. When the infection persisted after a few months of efficient wash-outs, he always performed the radical operation, preferring the Caldwell-Luc. He looked forward with hope to securing better results in antral infection in children by the employment of infra-red rays and short wave diathermy, as employed by Dr. Gutteridge, and thought that it was a definite advance in the treatment of antral disease.

Dr. R. M. GLYNN asked Dr. Gutteridge whether he could do much for subacute and chronic antritis by short wave therapy and infra-red rays. He stated that physicians in Adelaide were becoming very depressed with the results of treatment of chronic antral infections.

Dr. A. W. FARMER (Perth) thought that short wave therapy was of use in the early stages of sinusitis and *otitis media* and that it was especially helpful in the later stages.

Dr. Gutteridge, in reply, said that diathermy as used by MacKenzie was conducted heat, comparable with that of a poultice, and it was doubtful whether any heat reached the middle ear. By its employment he had never got any good results in sinusitis, whereas short wave therapy was of a different nature, producing heat deep in the tissues without heating appreciably the subcutaneous tissues.

In reply to Dr. Glynn, regarding chronic cases and recurrences of infection, Dr. Gutteridge said that he thought some definite improvement could be obtained.

Dr. Gutteridge did not approve of pernasal antrostomy. He described the movements of the carpet of mucus which, under stimulus of cilia, moved towards the nose-pharynx and was changed every four minutes. In the antrum there were definite movements towards the ostium and, despite antrostomy, the drainage did not take place through the opening. In his opinion, the antrostomy was only a form of ventilation. The removal of a tooth to drain the antrum failed for similar reasons. In adults he removed the anterior end of the middle turbinate and made a large opening in the region of the normal ostium as well as making antral drainage under the inferior turbinate. The infra-red rays restored the ciliary movements and normal function.

Posterior Nasal Sinusitis.

Dr. C. M. EADIE (Melbourne) read a paper entitled "Posterior Nasal Sinusitis". He said that posterior nasal sinusitis, which included inflammation of the sphenoidal sinuses and the posterior ethmoidal cells, was of special interest on account of the intimately related important structures. These infections did not seem to be recognized so frequently as anterior sinusitis. He then discussed the development, anatomy and physiology of the sphenoidal sinuses and ethmoidal cells, and showed tables representing observations made on the anatomy of the cells at 137 *post mortem* examinations. He said that sphenoidal sinus diverticula might be either recess-like extensions into surrounding parts or mucosal sacs through dehiscences in the osseous wall. The *dura mater* might be pushed ahead of such a mucosal evagination, or there might be an aperture in the *dura* through which the mucosa projected, to come in contact with the arachnoid. Recesses might extend ventrally, cranially, laterally, caudally or dorsally. The pterygoid recess, really a caudal one, had been most frequently found in his series. The ethmoid cells varied greatly in size and position. Dr. Eadie had found evidence of inflammation of one or both sphenoidal sinuses in 52 (35%) of the 148 cadavers examined by him. In these 52 cases both sinuses were usually affected together; but when only one was affected it was more frequently the right. The right sinus tended to be larger than the left, and more frequently had recesses; therefore drainage from it after an acute inflammatory lesion was more likely to be inadequate.

Dr. Eadie also discussed a series of 89 patients that he had investigated by means of the suction-exploration method devised by P. Watson Williams. Organisms were cultured from the material obtained from the sphenoidal

sinuses in 53 cases; the material was found to be sterile in the remaining 36. It should be noted that all these 89 patients had clinical signs of naso-pharyngeal infection.

As the result of further investigations Dr. Eadie had formed the opinion that failure to culture organisms from material washed from a sinus did not necessarily mean that the sinus was not infected. Suction-exploration of a sinus was of diagnostic value only if organisms grew on culture; but it was a useful procedure in treatment. Dr. Eadie expressed the opinion that radiological examination was of value if carried out by a radiologist who had special knowledge of the nasal sinuses; but the absence of radiological evidence of disease did not exclude the possibility of infection, perhaps localized in a diverticulum.

Dr. H. M. JAY (Adelaide) said that he himself had stressed this matter at the last Hobart congress, and was glad that Dr. Eadie had persisted in his efforts of further investigation of the sphenoid and ethmoid. He was further interested in Dr. Eadie's results of bacterial investigation of the wash-outs of the sphenoids and the antra. Dr. Jay rarely got positive results from the wash-outs, yet in many cases he was sure that the patient had some sinus infection. With regard to diagnosis, Dr. Eadie had not mentioned the rhino-pharyngoscope. Dr. Jay thought it an instrument of excellent value. It was possible by its use to see pus pouring from the sphenoidal ostium. He had seen two cases of retrobulbar neuritis due to sphenoidal sinusitis. He had had another case of interest. A railway man had failed in his colour vision tests and had got his red and green mixed on some days and not on others. On examination Dr. Jay had found the patient's nose full of polypi extending to the posterior region of his nose. After the nasal polyposis was cleared up and free drainage was promoted, his colour vision had returned to normal. This patient did not have retrobulbar neuritis. Dr. Jay was interested to hear Dr. Eadie refer to the lateral recesses of the sphenoids. He had had a patient in whom he was sure there was some kind of well-developed lateral recesses. The patient, a woman, had fluctuant swelling of both sides of the face in the region at the back of the angle of the jaw and in front of the ear, and a facial palsy on one side. On examination of her nose she presented signs of post-nasal infection and sphenocephalitis. After the operation on her sphenoids, all the signs and symptoms disappeared, the face returned to normal and the facial nerve recovered. She died some time later of another complaint.

Dr. E. A. MATISON (Adelaide) referred to a patient who had been ten years in bed, crippled with arthritis. Two years previously an operation on her bladder had left a fistula on her abdominal wall. She had symptoms of post-nasal catarrh and complained occasionally of an unpleasant smell in her nose. On examination there was evidence of pus posteriorly in the nose. Dr. Matison resected her nasal septum in her home and found on operation a large hard crust in the region of her sphenoid on each side. On removing these crusts he found a large piece of metal which had been responsible for the causation of the infection and the formation of the offensive crusts. The patient denied any knowledge of how the foreign body could have got into her nose. Since operation she had been very much better and was free of evident nasal infection.

Dr. C. SANGSTER (Adelaide) asked Dr. Eadie his technique in washing out the sphenoid. He wished to know whether Dr. Eadie at the same time explored the posterior ethmoid cells. He asked, further, was it possible for posterior ethmoidal infection to occur without infection of the sphenoid.

Dr. HUFF JOHNSTON (Sydney) said that most of his patients with sphenocephalitis had generalized headache. His method of procedure was usually to obliterate the ethmoidal cells with the ethmoid hook, and by that means he usually found that he secured good drainage.

Dr. MILTON COURTS (Sydney) expressed great interest in Dr. Eadie's remarks on X ray examination of the nasal sinuses. In his experience X ray examination of the nasal sinuses, even when done by radiologists who were experi-

enced in this branch of radiology, left much to be desired. He quoted in detail the case of a patient who had had chronic antral sinusitis with exacerbations over several years, and whose radiological reports had been unsatisfactory. Dr. Coutts felt that he could form a very good opinion of the condition of the antra by the combination of antral puncture, transillumination and the general appearance of the nose at repeated examinations.

DR. GARNET HALLORAN (Sydney) was of the opinion that negative wash-outs could be ignored as being of no importance. He asked Dr. Eadie what was the criterion of infection. Did he section the mucosa in all cases, and what method did he employ?

Dr. Eadie, in reply to Dr. Jay, who had suggested that he got no positive results from wash-outs, agreed that one could not rely on a negative result; he had stated this in his paper. With reference to the naso-pharyngoscope as a help in diagnosis, he used one, but had not become sufficiently expert to use it in all cases. The type which he had was not suitable for examining small children. He usually depended upon the use of a post-nasal mirror, but he fully appreciated the value of the naso-pharyngoscope as a help in diagnosis. He thought that Dr. Jay's patient with the swelling of the face and the facial paralysis was of extraordinary interest.

In reply to Dr. Matison, he thought that the presence of the foreign body which Dr. Matison had found undoubtedly had caused the infection in the nose, and the case was of unusual interest.

In reply to Dr. Sangster, Dr. Eadie said that it was his custom to wash out the posterior ethmoid in the same way as he did the sphenoids; but he was never quite satisfied where the fluid had gone, possibly sometimes into the spheno-ethmoidal recess. When the cells and the ostia could be seen, of course, it was easy. Further in reply, he said that the posterior ethmoidal cells could be infected without the sphenoids being involved.

Dr. Eadie, in reply to Dr. Huff Johnston, said that he thought that Dr. Johnston's treatment of wide removal of the ethmoid with the ethmoidal hook and his leaving the sphenoid alone was very good treatment. Dr. Eadie's experience in one case in which he had done wide removal of the ethmoid cells was somewhat disappointing because of the excessive crusting which had taken place in the nose as the result of this wide ablation.

In reply to Dr. Coutts, he said that he had found the X ray examination of great value when done by skilled radiologists. He placed more reliance on the X ray appearances of antra than on those of the sphenoids. When he found thickening of the lining as diagnosed by X ray findings, in recent cases he usually had the patient examined again by X rays in three or four weeks' time; and if he found that the thickening had somewhat settled down, he was content to do antrostomy, and he thought that most of the patients did very well.

In reply to Dr. Halloran, who had asked him his criteria of infection when the tissues were macroscopically normal, Dr. Eadie said that he had sent only thickened membranes for examination. He thought that in normal cases the sinus should be sterile.

Tuberculosis of the Larynx.

DR. F. E. LITTLEWOOD (Melbourne) read a paper on tuberculosis of the larynx. He said that the disease was caused by the tubercle bacillus in secretions from the lungs, or from infected tonsils, or the middle ear. It was doubtful whether primary infection ever took place in the larynx. The bacillus gained entrance through either unbroken or damaged epithelium, the ducts of racemose glands, or a traumatic abrasion. The lesions caused in the larynx were modified by its anatomy, but were similar to those in other organs. The entrance of Koch's bacillus caused a reaction of the tissues, with the formation of tubercles and a surrounding zone of inflammatory reaction. Stimulation of fixed connective tissue elements produced epithelioid cells, surrounded by a zone of small round mononuclear cells. The centre of the tubercle underwent necrosis because of its avascular condition and the action

of toxins with the formation of a large irregular giant cell. The formation of an ulcer was due to pressure on the epithelium by tuberculous tissue. When perichondritis occurred necrosis of the underlying cartilage took place. The disease spread to the surrounding tissues by way of the lymphatic vessels.

Dr. Littlewood said that the earliest symptom was usually an irritation of the throat, with recurring and increasing huskiness, which might become complete aphonia. It should be remembered, however, that a neurosis aphonia might occur in tuberculosis with involvement of the larynx. Swallowing was painful, and imperfect closing of the glottis gave rise to a cough. In the early stage of intrinsic infection local examination showed a pale larynx, with a reddish congestion of one cord or a whitish accumulation of epithelium in the posterior commissure. If the infection started in the epiglottic or arytenoid region there was unilateral swelling, with an increase in substance, and yellow-grey nodules showed through the mucous membrane. If the epiglottis was affected it was swollen. Later the part might ulcerate, and eventually complete destruction took place. In making a diagnosis of tuberculosis of the larynx, a thorough examination of the chest and sputum was necessary, as unilateral spots in the larynx were sometimes caused by syphilis or cancer. Dr. Littlewood thought that, as a rule, the condition of the larynx followed that of the lungs, and the progress of laryngeal tuberculosis was an index to the patient's general condition. He stressed the importance of early examination of the larynx in all tuberculous patients. Chevalier Jackson rarely found a normal larynx in active pulmonary tuberculosis.

Dr. Littlewood then discussed treatment. General treatment was that of the general condition, with complete vocal rest, and splinting of the lung by an artificial pneumothorax usually had a beneficial effect on the laryngeal lesion. Many remedies had been used in local treatment. Direct or auto-insufflation of powders, such as chloretoine, gave relief for about twenty-four hours. Various gold salts had been injected with success. Surgical treatment depended on the condition of the patient. By using indirect laryngoscopy or the suspension laryngoscope, papillary excrescences and granulations could be removed. In advanced cases the epiglottis might be amputated. Diathermy or electro-coagulation was not satisfactory, and tracheotomy was seldom performed. If swallowing was very painful, the recurrent laryngeal nerve might be blocked with alcohol, and so paralysed for about four weeks. Pericarotid sympathectomy had been performed to produce vaso-dilatation of the vessels of the larynx. In early cases carbon arc light baths were often effective. Dr. Littlewood considered X ray treatment indicated only in chronic stationary forms, and considerable experience was necessary before it was used. Little was known of the results of radium or radon needle treatment. According to Chevalier Jackson, the best medical treatment was vocal rest, combined with local application of Burmese chaulmoogra oil.

In conclusion, Dr. Littlewood said that it should be remembered that tuberculosis of the larynx was not a disease in itself, but was part of the general tuberculous condition of the patient, and cooperation between the radiologist, physician and laryngologist was necessary for its successful treatment.

DR. R. V. HENNESSY (Melbourne) said that in advanced cases with dysphagia and food going the wrong way, he found that the patient could swallow very much better by the Wolfenden method, in which the patient lay on the stomach and sucked the food up a tube. Another feature that he had found was that before there was any obvious sign of tuberculous lesion of the larynx, the patient complained of weakness of the voice; he had noted that school teachers and such people who had to do much talking, frequently presented themselves to the laryngologist for examination with this symptom of weakness and softness of the voice as their only complaint. On examination of the larynx, nothing abnormal might be detected. In syphilis and cancer of the larynx there was alteration of the voice, harshness and alteration of pitch without any noticeable weakness, but in tuberculosis there was loss of power of

the voice with softness. He likened this sign of tuberculosis to others, as, for example, in tuberculosis of the hip. In this instance the patient had a limp, and showed wasting of the muscles activating the joint. If the larynx was regarded as a joint, he wondered whether this softness and weakness of the voice could be explained by muscular weakness around the joints of the larynx. Another point which was of interest to him was that well-defined clinical tuberculosis of the larynx of the senile form was almost invariably unilateral and commonly mistaken for malignant disease. This type involved the ventricular fold only. It was common in elderly males and rare in females. A history of tuberculous infection was given very grudgingly, although clinical and radiographic evidence would be found in the chest. One point that helped in the diagnosis of this unilateral type was ankylosis of the arytenoid joints, but Dr. Hennessy was emphatic that the lesion was usually on a ventricular fold, whereas malignant disease was rarely found in this region. Dr. Hennessy quoted an experience of his own in this regard. He had in one instance carried out a Wassermann test which gave no reaction, but he did not do biopsy. He had treated the patient by Harmer's operation on the assumption that the lesion was cancerous, but some time after treatment the patient got progressively worse with rapid spread of laryngeal tuberculosis. Another case in which the lesion was confined to the cord and suggested malignant change, was diagnosed correctly as tuberculous after X ray examination of the chest revealed obvious signs of pulmonary tuberculosis.

DR. R. M. GLYNN (Adelaide) had seen three cases in which he had advised tonsillectomy while the patients had evident tuberculosis of the larynx. He wondered whether, as laryngologists, they sufficiently stressed the importance of cleaning up the nasal and tonsillar infections in patients suffering from laryngeal tuberculosis.

DR. C. L. ROSEFIELD (Melbourne) had investigated the statistics which he had obtained from the superintendent of his local sanatorium for tuberculosis. Among a thousand patients with pulmonary tuberculosis, 8% had tuberculosis of the larynx.

DR. EDGAR BROWN (Adelaide) had at times found tuberculosis of the larynx very difficult to diagnose. He had had one patient in whom the laryngeal picture was typical of carcinoma, and he had suggested X ray examination as a means of excluding tuberculosis. Later the picture had changed to that of tuberculosis of the larynx. The patient had evidence of tuberculosis in one lung. The patient had quite recovered. Dr. Brown had another case with the typical laryngeal picture of tuberculosis; he did biopsy, and the report on the section was carcinoma. He thought that in treatment of tuberculosis of the larynx it was necessary to get back to the old principles of rest, fresh air and vitamins.

DR. M. COURTS (Sydney) supported what Dr. Edgar Brown had said about the importance of diagnosis. Two days before leaving Sydney he had done biopsy by direct laryngoscopy of a tumour growing below the anterior third of the right vocal cord. It had been necessary to give the patient a general anaesthetic. Huskiness had been noticeable for six weeks only, and by indirect laryngoscopy a small tumour was visible, not unlike carcinoma, but possibly not so white in appearance as was usually seen. The patient, a man of fifty years, had been proved to be tuberculous, and had spent six years in a sanatorium, though for some years now he had presented no evidence of active tuberculosis. The arytenoids were slightly swollen, and there was some increase in the interarytenoid tissue. The pathologist's report, which he had just received, stated that the condition was one of haemangioma with ulceration, and that there was no evidence of tuberculosis or malignant disease.

DR. GARNET HALLORAN (Sydney) had been very interested in the discussion, and said that he would content himself by quoting two aphorisms which had always appealed to him: "Fatness is the cure of tuberculosis", and, in the words of Hijek, "Money is the cure of tuberculosis". He thought these aphorisms well worth keeping in mind.

DR. Littlewood, in reply, said that he thought that fatigue of the voice was one of the first indications of laryngeal tuberculosis. Routine examinations should be made in all cases so as to achieve early diagnosis.

The Extended Schwartz Operation.

DR. ERIC GUTTERIDGE (Melbourne) read a paper entitled "The Extended Schwartz Operation", in which he discussed a method of performing attico-antrostomy without interference with the integrity of the membranous meatal canal and with drainage through the post-aural wound.

Dr. Gutteridge said that the operative treatment of chronic otitis media was commonly divided into simple mastoidectomy and more or less radical mastoidectomy, in which the various compartments of the ear were attacked and the resulting cavities were drained into the external auditory meatus by removal of the posterior portion of the membranous canal. The most important factor, Dr. Gutteridge said, was the integrity of this membranous canal; the Schwartz operation might be extended to drain the upper compartment of the middle ear. Dr. Gutteridge then described the anatomy of the middle ear in some detail, and went on to enumerate the pathological changes which might occur after the primary acute infection. He said that these changes could be summarized in four stages, which were (i) the stage of inefficient drainage, (ii) the stage of desquamation of the mucous membrane, (iii) the stage of fibrosis, and (iv) the stage of necrosis, in which extracranial and intracranial complications might be produced. He suggested that the upper compartment of the middle ear, with its extension into the aditus and the mastoid antrum, was of paramount importance in the continuance and spread of the aural infection.

Dr. Gutteridge said that it was generally agreed that removal of the contents of the middle ear, as in the radical mastoid operation, should be performed only when more conservative methods held out no hope of success, and he went on to describe and to discuss the operation known as simple Schwartz mastoidectomy, and the Bondy, Jansen-Bayer and Jenkins operations. He said that these modified radical mastoidectomies were suitable for patients with attic perforations or for those with small central or postero-superior perforations. The two main objections to attico-antrostomy in these forms were the prolonged period of treatment required before complete dermatization of the cavity was obtained, and the interference with the ceruminous production and extrusion of the external canal.

Dr. Gutteridge then suggested that the operation of attico-antrostomy could be more often utilized if it were simplified by the omission of the plastic flap and of drainage by the meatal route. If the outer wall of the attic was removed as far as the zygomatic process and taken down to the *annulus tympanicus*, this being left intact, the whole of the infected upper compartment of the middle ear and the antrum was exposed and could be cleared of infected mucosa and granulation tissue. The facial ridge was reduced, and the bridge remained intact, as in the Bondy operation. If the membranous meatal canal and its connexions with the tympanic ring were left intact, the result was a simple Schwartz mastoid cavity with a small attic extension, which should become obliterated by fibrous tissue growing from the bony walls of the cavity and the intact posterior wall of the membranous meatus.

Dr. Gutteridge then gave details of the operation of extended Schwartz mastoidectomy. He said that the area of operation was infiltrated with 30 cubic centimetres (one ounce) of 1% "Novocain" solution, to which had been added 0.3 cubic centimetre (one minim) of 0.1% adrenaline solution; this created a bloodless field and diminished shock. The ordinary post-aural incision was prolonged forwards to the anterior border of the auricle, and a semi-lunar section, six millimetres in depth, was removed from the upper skin flap to prevent unsightly sagging of the auricle. The mastoid antrum was opened, and the outer attic wall was chiselled down until the attic was opened, when the wall was removed almost to the tympanic ring. The dura of the *tegmen tympani* was usually exposed. The attic was opened to the root of the zygoma, and part of the facial ridge was removed, but the membranous canal

was not detached or opened. All granulations and mucosa having been removed, the cavity was closed by primary suture, or a small rubber tube might be inserted into the lowest extremity of the wound. This was removed in three days, and the wound was allowed to heal. A gauze strip soaked in a solution of 0·1% acriflavine in liquid paraffin was inserted into the external auditory meatus and replaced for one or two days, to prevent accumulations of secretions behind the membranous meatal wall and subsequent narrowing of the canal. The patient could usually leave hospital with a healed wound in a fortnight.

Dr. Gutteridge said that the method was applicable to all types of perforations, small or complete; it could be used if there was a polypus in the middle ear that could be removed through the meatus. Granulations covering the labyrinthine wall indicated the need for a more radical operation. Of a series of patients on whom the operation had been performed, including one with perilabyrinthitis, approximately 80% had a complete cessation of the aural discharge and improvement in hearing within a month. Dr. Gutteridge concluded his remarks by saying that as the main source of infection was obliterated by this operation, any residual infection would be accessible to meatal treatment and zinc ionization.

Dr. JOHN SHAW (Melbourne) disagreed with almost all that Dr. Gutteridge had said. Dr. Gutteridge had divided mastoid surgery into the Schwartz operation and the radical operation and had said that the Schwartz operation as ordinarily performed gave little measure of success. Dr. Shaw was of the opinion that the radical operation should be performed when it was indicated. The next point which Dr. Gutteridge had brought forward as an argument against a radical operation was the accumulation of cerumen and débris in the post-operative cavity. In Dr. Shaw's opinion the disability from this factor was extremely small and was very easily dealt with. He asked what was the importance of doing this modified operation that Dr. Gutteridge was so attached to. In his (Dr. Shaw's) opinion it was almost as futile a means of treatment as the smaller incision for doing appendicectomy. Dr. Gutteridge had said that Jenkins's operation was unsuitable, but Dr. Shaw asked where Jenkins's operation failed. Dr. Gutteridge's real objections to the radical operation seemed to be (a) the amount of time taken and (b) the amount of after-care necessary. Dr. Shaw was sure there was no short road to success, and he had learned this. He had done the extended Schwartz operation when he had thought necessary in acute cases, and, as Dr. Gutteridge had pointed out, the blood clot filled the space, and, therefore, this operation would be unsuitable in chronic cases in which drainage was apparently necessary. He felt certain that so far as the care of chronic *otitis media* was concerned, when the necessary operative procedure was done it was still necessary to devote time to the after-care, which was an essential part of the treatment.

Dr. HUFF JOHNSTON (Sydney) said that Dr. Gutteridge's procedure was known to him. He had performed the operation along these lines on several occasions and he did not close the wound, but the method of throwing the attic open was good surgery and apparently had been found good in Dr. Gutteridge's hands.

Dr. E. A. MATISON (Adelaide) thought that in the surgery for chronic suppurative *otitis media* it was important to try to save the hearing, especially in children. He was now more conservative than he had been, but found it difficult to select the right cases for conservative surgery. Dr. Gutteridge's address was very interesting and his anatomical description was excellent.

Dr. CLIVE EADIE (Melbourne) appreciated Dr. Gutteridge's suggestions about the attic treatment as suggested by Bondy, but he thought that whether the operation was done through the mastoid wound or through the external canal the difficulty was in obtaining adequate drainage. He agreed that opening the attic as was done in the extended Schwartz operation was good surgery. What did Dr. Gutteridge mean by 5% failures in acute mastoiditis? Dr. Eadie did not accept this. When granulation was present in the attic region he removed

the soft tissue of the external canal. In cholesteatoma, to be certain of adequate drainage, it was advisable to remove the outer attic wall, plus the membrane. He thought that to plug the membrane back onto the deeper layer of infected mucous membrane was expecting too much of the healing propensity of the necessarily diseased tissues.

Dr. MILTON COUTTS (Sydney) had seen Dr. Graham Brown, of London, carry out a similar procedure to that described by Dr. Gutteridge. He (Dr. Coutts) had since performed the operation in two cases of chronic suppurative *otitis media* in which the membrane was intact, and in which the discharge was coming from a deficiency in the antero-superior region of the external canal adjacent to Shrapnell's membrane; in both cases the perforation involved only the margin of Shrapnell's membrane. One case had terminated satisfactorily. In the other there was still a small amount of offensive discharge, although in the affected ear the hearing was almost 80% that of the other ear. Dr. Coutts regarded the result as very unsatisfactory, but he felt that the radical operation would have been a much more logical procedure. With regard to the treatment of suppurative *otitis media* in children, he adopted much the same attitude as he adopted towards maxillary antritis in children; he first did the simple Schwartz operation, extended if the cells in the region of the bridge were large and infected. If after some reasonable lapse of time the aural discharge persisted, he had no hesitation in doing the radical operation as a means of terminating the condition. In his experience the greater proportion of patients, 60% or more, got a dry healed wound and with some degree of hearing. A small proportion of patients after radical operation had persistent moisture in the ear, though the cavity was well dermatized. This moisture was usually mucous in nature and the result of a still patent Eustachian tube. The patients were very little inconvenienced and Dr. Coutts thought that he was still justified in doing a radical operation because the patient had been saved, from the point of view of intracranial complications.

Dr. R. M. GLYNN (Adelaide) thought that the number of cases in which Dr. Gutteridge's operation would be suitable was small. He thought that he would perform the operation in only a few of his cases. He thought that most of the attico-antrostomy operations were unsatisfactory.

Dr. GARNET HALLORAN (Sydney) reserved judgement on Dr. Gutteridge's paper and said he would like to read it and then to try the operation before coming to his decision.

Dr. Gutteridge, in reply to Dr. Eadie, said that he meant by the 5% failures those operations in which healing did not occur by his method of closure and drainage. In most cases he had to plug the wound and allow it to heal by granulation.

(To be continued.)

British Medical Association News.

VICTORIAN BRANCH NEWS.

THE following items of news, of particular interest to members of the Victorian Branch of the British Medical Association, are published at the request of the Council of that Branch.

Workers' Compensation.

At the last meeting of the Federal Council the question of medical service to persons coming under the provisions of the Commonwealth *Employees' Compensation Act* was considered and the opinion was expressed that there should be no interference with the right of the worker to choose his own medical attendant, and that if he had no regular

medical attendant he should be furnished with a list from which he might choose.

The council also decided that when an insurance company requires a consultation between its medical officer and the attending practitioner, the insurance medical officer should take no active part in the treatment of the patient without the expressed request of the practitioner concerned.

Under the terms of the existing lodge agreement, as members have been previously informed, they are debarred from claiming fees for services to lodge members coming under the provisions of the *Workers' Compensation Act*, unless the services rendered are outside the scope of the agreement, for example administration of anaesthetics, operations under anaesthesia *et cetera*.

Following negotiations with the Friendly Societies' Association, the results of which have been accepted by the individual societies, it has been agreed that lodge agreements will be amended to provide:

That if a member sustains personal injury or contracts disease in respect of which he has a claim for compensation under the *Workers' Compensation Act* 1928, the *Commonwealth Employees' Compensation Act* 1930, or the *Seamen's Compensation Act* 1911, or any subsisting amendment of any of the said acts, the medical officer shall be entitled to claim and receive from such member, in addition to the fees chargeable by him under the provisions of Clause 6 hereof, fair and reasonable remuneration for professional services rendered to such member in respect of such injury or disease, but such member shall not be required to pay the medical officer for services other than those referred to in Clause 6 hereof any sum greater than the amount received by him for medical expenses under the provisions of any of the said acts or any subsisting amendment thereof.

In most cases new agreements will be printed, although a few will be altered by the use of a supplementary agreement, and members are particularly requested to sign the new agreements without delay when they are distributed within the next few weeks.

There are probably many doctors acting as lodge medical officers who have never signed agreements, and it is essential that every medical officer to a lodge should in future be working under the terms of a properly executed contract.

Friendly Society Lodge Practice.

Old-Age Pensioners as Dependents of Lodge Members.

The common form of agreement provides that the term "member" includes "the widowed mother of an unmarried member if resident with and wholly dependent upon him" and "that the expression 'dependent' shall mean: (a) a person entitled to medical attendance partially dependent on the member; (b) a person entitled to medical attendance partially dependent on the member where the cost of such dependent exceeds £25 per annum".

A member of the association recently inquired whether a widowed mother in receipt of an old-age pension, whose son was a member of a lodge, was entitled to medical service, as *prima facie* the pension made her not "wholly dependent".

The Branch Council considers that a person receiving an old-age pension cannot be regarded as wholly dependent on a lodge member and is therefore not entitled to lodge treatment, and that the onus of proof rests with the lodge member where it is claimed that the cost of a person partially dependent exceeds £25 per annum.

Dependants of Female Lodge Members.

Following a recent increase in the number of female members of lodges, the question has arisen whether the children of a female lodge member, whose husband is in employment and not a lodge member, are entitled to the services of the lodge medical officer.

The Branch Council considers that in such cases, if the combined incomes of the husband and wife exceed £312 per annum, plus £26 per annum for each dependent, the children of the female member are not entitled to receive lodge medical attendance.

NOMINATIONS AND ELECTIONS.

The undermentioned has applied for election as a member of the Western Australian Branch of the British Medical Association:

Staricoff, Mendel, M.B., B.S., 1933 (Univ. Melbourne),
Menzies.

The undermentioned has been elected a member of the New South Wales Branch of the British Medical Association:

Jakins, William Barton, M.B., 1935 (Univ. Sydney),
c/o Dr. A. L. Caselberg, Corrimal.

Correspondence.

WILLIAM GIBSON RESEARCH SCHOLARSHIP.

SIR: With reference to the advertisement of the above scholarship for medical women which you recently inserted for us, I beg to inform you that my council has awarded the scholarship to Dr. Nancy E. G. Richardson, of London.

Dr. Richardson proposes to carry out research on "Carbohydrate Metabolism in Pregnant and Lactating Women in Relation to the Principles Secreted by the Anterior Lobe of the Pituitary".

Yours, etc.,

G. R. EDWARDS,
Secretary.

1, Wimpole Street,
London, W.1.
August 6, 1937.

FIRE-WALKING.

SIR: In November, 1935, you thought fit to publish a series of letters upon this subject, amongst them one from my non-medical, archaeological self. One of our leading surgeons here, knowing of my Pacific islands experience of fifty years, brought my insignificant opinions to your editorial table.

I showed that, as you headed my letter, a "simpler explanation" than that of mumbo-jumbo, or magic, sufficed for the scientific mind; and that the time of walking upon the heated surface was to be registered in about five seconds, or two seconds per foot, instead of the minutes, always stated up to date.

May I now draw your scientific readers' attention to an article in *The Listener* of August 11, in which accounts appear of a series of experiments with fire-walkers made by the University of London Council for Psychical Investigation at Carshalton in April of this year, which fully corroborate my statements regarding my own tests at Mbengga, Fiji. Ordinary soft-footed civilized whites were able to do the walk without sacred or other preparation. The horny-pedalled islanders, or Indians, who can wander over prickly coral surfaces that a common or garden specimen of European could not step on, find the fire-walking easy enough!

Yours, etc.,

"Goldicourt".
Waverton,
New South Wales,
October 3, 1937.

ARTHUR J. VOGAN.

THYROID GLAND STANDARDS.

SIR: A doubt does exist very often in the mind of the dispenser as to whether the prescriber intends the patient to receive thyroid gland preparations of the British Pharmacopoeia 1932 standard, which is five times stronger than previously.

The legal position is unequivocal, but may we appeal to your members to specify their instructions definitely when the legal standard is not required.

It is solely a matter of notation and dosage.

Yours, etc.,

Melbourne, HENRY FRANCIS AND COMPANY.
October 11, 1937.

COMMON PROBLEMS IN GENERAL PRACTICE.

SIR: In your issue of October 9 is reported an interesting address by Dr. G. W. Ashton on "Common Problems in General Practice", delivered on August 4. In the early part of the address Dr. Ashton, after some criticism as to the composition of the Council of the Victorian Branch, British Medical Association, says: "I do not see how a council composed as it is at present can truly represent the feelings and interests of the general practitioners" *et cetera*. Very well.

Later on Dr. Ashton discusses the problem of the "unwanted pregnancy" and hints that something ought to be done to render it legal to terminate the pregnancy if the mother is harassed by "a moral or an economic fear".

In your report of the discussion following on the paper, Dr. Derham "considered that the influence of the Council of the Victorian Branch should be used to secure some desirable alterations in the law relating to abortion". Professor Marshall Allan said that "it seemed probable that something would be done along the lines that had been suggested by Dr. Derham".

Dr. Ashton is not recorded as having made any protest against the Council proceeding to deal with the matter. Whether anything actually has been done since August 4 I am not aware. It seems to me that, in view of Dr. Ashton's early remarks, he would be most inconsistent in thinking that the Council should recommend a legal change which would have a profound influence on the life of every general practitioner in the State, without the general practitioners being consulted as to their opinions on the subject.

Should a questionnaire be submitted it would be found that a very large number—quite probably the majority—of general practitioners would not desire that it should be made legal for them to terminate pregnancy on the ground of a "moral or economic fear" on the part of the mother.

Yours, etc.,

H. G. LOUGHREAN.

"Sari. Bair",
15, Jennings Street,
Kyneton,
October 12, 1937.

THE RESULTS OF RADICAL ANTRUM OPERATIONS IN CHILDREN.

SIR: I read with great interest the article by Dr. G. A. D. McArthur, entitled "The Results of Radical Antrum Operations in Children", which appeared in your issue of September 18. One statement which Dr. McArthur made was: "Dentists ridicule the assertion that the permanent teeth would be damaged, and say that whoever makes such a statement does not know his anatomy." I feel this might lead to a false conception in the minds of many practitioners. I have seen numerous intra-oral X ray films which indicated that if the lining of the antrum were stripped there would be a definite possibility of interfering with the tooth germs of one or more of the permanent teeth. Even if the apical portion of an incompletely formed root is not actually within the antrum (and frequently it is), the bony floor of the sinus in a child, aged ten years or less, is so thin that even with the most delicate technique there is a grave risk of injuring that portion of the tooth germ which is completing the calcification of the root.

Symington and Rankin's "Atlas of Skiagrams", illustrating the development of the teeth, indicates the danger of possible dental injury where the radical antrum operation is performed on children between the ages of four and twelve years. Dr. McArthur quoted one case where the permanent teeth in the upper jaw erupted normally following double radical antrum operation at the age of one year and nine months. Such a case should not be taken as a criterion, because in a child of that age little calcification has taken place in the permanent teeth, and these are comparatively more distant from the antral floor.

Yours, etc.,

ARTHUR AMIES.

The Australian College of Dentistry,
193, Spring Street,
Melbourne,
October 12, 1937.

THE ACTION OF MYDRIATICS.

SIR: An observation made by me thirty or forty years ago, but unpublished, may be of interest in connexion with Sir James Barrett's note in your issue of October 2.

With the patient, a child, lying in the dorsal position, the eyelids were held apart, and an ophthalmic tabloid of atropine (Burroughs Wellcome and Company) was placed on the edge of the cornea, the eyelids being kept apart so that the drug could not be dissolved in the general conjunctival fluid.

Very soon the radiating fibres of the iris immediately underlying the tabloid began to contract, dilating the pupil, only at that part and before any uniform dilatation appeared. This satisfied me that the initial action of atropine is to stimulate the radiating fibres of the iris, and that the drug acted either directly on the muscle fibres or through the peripheral termination of the nerve fibres to the iris muscles.

Yours, etc.,

Brisbane,
October 13, 1937.

J. LOCKHART GIBSON.

Congress Notes.

LOST PROPERTY.

We have been asked by the Joint Honorary Secretaries of the fifth session of the Australasian Medical Congress (British Medical Association), that was held at Adelaide in August, to publish the following information.

Two sets of war medals, which had apparently been mislaid at the congress ball, are in their possession: one set contains the Military Cross, the 1914-1915 Star, the General Service Medal and the Victory Medal; the other set contains the 1914-1915 Star, the General Service Medal, the Victory Medal and the Coronation Star. The owners of the medals should apply at the office of the South Australian Branch of the British Medical Association.

A set of golf clubs in a golf bag bearing the initials "J. G. de H." has been left at the Royal Adelaide Golf Club at Seaton; it is thought that this may belong to a member of congress. The owner should apply to the Secretary of the Royal Adelaide Golf Club for the return of his property.

Obituary.

ALEXANDER STEVEN.

We regret to announce the death of Dr. Alexander Steven, which occurred on October 11, 1937, at South Yarra, Victoria.

Books Received.

SPEECH TRAINING FOR CLEFT PALATE PATIENTS, by H. P. Pickerill, C.B.E., M.D., M.S., F.A.C.S.: 1937. New Zealand: Whitcombe and Tombs Limited. Foolscap 8vo, pp. 36. Price: 4s. 6d. net.

MECHANISMO PROBABLE DE LA CANCERIZACION (ENSAYO PATHOGENICO), edited by Americo Garibaldi; Volumes I and II: 1936. Lima: Facultad de Ciencias Medicas. Imperial 8vo, pp. 608.

PATHOLOGY OF THE CENTRAL NERVOUS SYSTEM. A STUDY BASED UPON A SURVEY OF LESIONS FOUND IN A SERIES OF FIFTEEN THOUSAND AUTOPSIES, by C. B. Courville, M.D.: 1937. California: Pacific Press Publishing Association. Royal 8vo, pp. 344, with illustrations. Price: \$5.75.

AUTOPSY DIAGNOSIS AND TECHNIQUE: A MANUAL FOR MEDICAL STUDENTS, PRACTITIONERS, PATHOLOGISTS AND CORONERS' PHYSICIANS, by O. Saphir, M.D., with a foreword by L. Hektoen, M.D.: 1937. New York: Paul B. Hoeber Incorporated; Australia: Angus and Robertson Limited. Crown 8vo, pp. 362, with 65 illustrations. Price: 36s. net.

TWEEDY'S PRACTICAL OBSTETRICS, revised and largely rewritten by B. Solomons, M.D., F.R.C.P.L., F.C.O.G., M.R.I.A., F.A.C.S., and N. McL. Falkiner, M.D., Sc.D., F.R.C.P.L., F.C.O.G.; Seventh Edition: 1937. London: Humphrey Milford; Australia: Angus and Robertson Limited. Demy 8vo, pp. 793, with illustrations. Price: 37s. 6d. net.

LIGHT THERAPY, by F. H. Krusen, M.D.: Second Edition: 1937. New York: Paul B. Hoeber Incorporated; Australia: Angus and Robertson Limited. Large crown 8vo, pp. 258, with 42 illustrations. Price: 21s. net.

CLINICAL REVIEWS OF THE PITTSBURGH DIAGNOSTIC CLINIC: GUIDEPOSTS TO MEDICAL DIAGNOSIS AND TREATMENT, edited by H. M. Margolis, B.S., M.D., F.A.C.P.: 1937. New York: Paul B. Hoeber Incorporated; Australia: Angus and Robertson Limited. Medium 8vo, pp. 573. Price: 32s. 6d. net.

WHEELER AND JACK'S HANDBOOK OF MEDICINE, revised by J. Henderson, M.D., F.R.F.P.S.: Tenth Edition: 1937. Edinburgh: E. and S. Livingstone. Crown 8vo, pp. 718. Price: 12s. 6d. net.

NUTRITION AND SEX, by J. A. Silburn: 1937. London: Methuen and Company Limited. Crown 8vo, pp. 176. Price: 5s. net.

Diary for the Month.

- OCT. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
- OCT. 27.—Victorian Branch, B.M.A.: Council.
- OCT. 28.—New South Wales Branch, B.M.A.: Branch.
- OCT. 29.—South Australian Branch, B.M.A.: Branch.
- NOV. 2.—New South Wales Branch, B.M.A.: Organization and Science Committee.
- NOV. 2.—Tasmanian Branch, B.M.A.: Council.
- NOV. 3.—Western Australian Branch, B.M.A.: Council.
- NOV. 4.—South Australian Branch, B.M.A.: Council.
- NOV. 5.—Queensland Branch, B.M.A.: Branch.
- NOV. 9.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
- NOV. 9.—Tasmanian Branch, B.M.A.: Branch.
- NOV. 10.—Victorian Branch, B.M.A.: Branch.
- NOV. 12.—Queensland Branch, B.M.A.: Council.
- NOV. 16.—New South Wales Branch, B.M.A.: Ethics Committee.
- NOV. 16.—Tasmanian Branch, B.M.A.: Council.
- NOV. 17.—Western Australian Branch, B.M.A.: Branch.
- NOV. 18.—New South Wales Branch, B.M.A.: Clinical Meeting.
- NOV. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," pages xiv to xvi.

CAIRNS HOSPITALS BOARD, CAIRNS, QUEENSLAND: Medical Superintendent, Assistant Medical Officer.

FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Resident Medical Officer.

KANEKATSU MEMORIAL INSTITUTE, SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Senior Pathologist.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135 Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178 North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

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